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Mac Quick Tips

Solving Problems,
Preventing
Crashes —
Doing It the
Mac Way!

**Inside: Tips & Tricks • You Ask, We Answer
New Owners • The Way It Works**

Edited by Alan Stafford



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General Offices

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Mac Quick Tips

Solving Problems, Preventing Crashes –
Doing It the **Mac** Way!

**Written by the
Editors at MacHome**

Tips & Tricks

3

Suggestions to Help Increase
Your Productivity

You Ask, We Answer

27

Easy Answers for Hard Questions

New Owners

3

Get the Most out of your Macintosh

The Way It Works

53

The Inner Workings of Your Mac

Tips & Tricks

Suggestions to Help Increase Your Productivity

Taming the SCSI Monster

We all know the Mac is the easiest computer to use, right? But throw SCSI (Small Computer Standard Interface) into the mix and does this remain the case? It depends on how well you control the notorious SCSI Monster.

If any facet of using a Mac generates hair-pulling episodes, it's installing new SCSI devices. SCSI devices include hard drives, CD-ROM drives, scanners, and other hardware peripherals. That's because SCSI can be extremely finicky about how you install devices to your Mac.

Here are some tips you'll want to remember when attaching SCSI devices:

- Use the shortest SCSI cables possible between devices. The total length of your SCSI chain can't exceed eighteen feet of SCSI cabling. Keeping the cables short dramatically reduces the chances of experiencing SCSI conflicts. To help in this regard, keep your SCSI devices as close to each other as possible. Doing so means you can use much shorter cables to attach one device to another.

- Pay particular attention to the position of SCSI devices within the chain. With SCSI, you have two extremes: clean and dirty. Clean denotes devices that pose few SCSI chain communication problems, and dirty denotes just the opposite. Clean devices include removable storage devices (such as Jaz, SyJet, and Zip drives); dirty devices include scanners and some SCSI-specific printers (most notably from Alps). Position dirty devices at the end of a SCSI chain to minimize the chance of a conflict.

The only exception to this rule occurs with devices such as the Paperport and Paperport Strobe from Visioneer. Although these devices are scanners, Visioneer designed them for placement at the beginning of the SCSI chain.

- If, after installing a new SCSI device, your Mac won't boot properly, try placing the device in another position within the chain. Doing so often eliminates SCSI conflicts.

- Use the best SCSI terminator you can afford, such as the Sentry II from APS Technologies. Terminators are essential to the proper operation of your SCSI chain. They tell

your Mac where the chain ends, or terminates. Poor-quality terminators

cause more problems than they're worth, and using no terminator at all, in most cases, prevents your Mac from booting. Some devices, such as the Jaz and Zip, come with termination capabilities built in.

- Each SCSI device within your SCSI chain needs its own unique ID number. Having two or more devices with the same ID causes no end of problems. For this reason, make sure each SCSI device in your chain has a different ID. Each SCSI device has a switch, a button, or dip switches with which to set its SCSI ID.

By the way, the Mac supports seven separate SCSI devices, but the internal hard

**Each SCSI device
within your SCSI chain
needs its own unique
ID number.**

drive (SCSI ID 0) and CD-ROM drive (SCSI ID 3) count as two of them. That means you can install five additional SCSI devices to your Mac, selecting among the remaining SCSI IDs of 1, 2, 4, 5, and 6. What about SCSI ID 7, you ask? It's reserved for your Mac's logic board.

Breaking the Barrier

Have you ever downloaded a file or shareware application, or received an e-mail attachment, only to double-click on its icon and receive nothing but a screen full of jumbled characters? If so, the file or application is probably compressed.

Compressing files and applications makes them much smaller than they are in their normal state. This means it takes much less time to upload or download them with a modem.

Compressed files almost always have a special suffix at the end of their filename that lets you know they're compressed, such as .sit or .zip. Additionally, you may see the .bin and .hqx suffixes for compressed files downloaded from the Internet. The various suffixes designate the type of encoding used. For example, .sit means the file was compressed with StuffIt, while .zip means it's a zipped file. The .bin stands for MacBinary 5, and .hqx stands for MacBinary 4.

Before you can use a compressed file, you must first decompress it. To do so, download the freeware utility StuffIt Expander from one of the online services or the World Wide Web. To compress your own files for e-mail or uploading to

another computer, get StuffIt Expander's supplement, DropStuff, which is a shareware utility.

A Matter of Technology

It's time to buy a new monitor — do you know which monitor technology best serves your needs? Besides a plethora of other considerations, such as image quality and size, you should consider what you need a monitor for when determining which to select.



As a general rule of thumb, if you use your Mac for CAD (Computer Aided Design), work with lots of numbers and spreadsheet applications, or spend lots of time staring at the interface of a word processor, consider a monitor built with shadowmask technology. Shadowmask technology provides a much sharper screen image, making small numbers, letters, and lines easier to see.

If you work with or create lots of graphics and illustrations, or work in the desktop publishing or prepress industries, look at monitors with aperture grille technology. These monitors generally provide more vibrant colors and a brighter picture.

Are You Justified?

If there's one thing we all want our documents to be, it's professional looking. However, in their attempts to create pro-

fessional-looking letters and reports, many Mac users employ the Justified command found in word-processing applications.

Justifying makes text as straight on the right-hand edge as it is on the left. You often see justified text in magazines, books, and newspapers, and it looks pretty darn good — when done right.

The problem, however, creeps in when you justify text with an application that has no business having a Justified command — as is the case with most word processors.

Odds are your word processor can justify text, but does so by expanding or contracting the space between words. Try it with your word processor to see what I mean. The results are often horrible-looking documents, riddled with uneven spacing from one line of text to the next.

For justification to be truly effective, the application must also adjust the space between individual characters (a process known as kerning). Only then will your justified text look natural from line to line. Applications that support kerning fall into the page layout category and include QuarkXPress and PageMaker on the high end and MacPublisher and HomePublisher on the low end.

If your word processor doesn't have a kerning feature, and you don't own a page layout application, stay away from justified text. Your documents will look much more professional and will be easier to read.

In Full View

Ever wished you had a quick means of finding out what a particular font looked like? Well, here's an easy solution you can put to work right away: Make an alias of your Fonts folder, which is inside the System Folder, and keep the alias on your desktop. Whenever you need to know what a particular font looks like, double-click on the Fonts alias, locate and double-click on the font's suitcase file, and then double-click on the font file found inside the suitcase. You'll see a window open that displays the font in various point sizes.



Why the Chrome Bags?

Have you ever bought RAM modules, a NuBus or PCI card, a new CPU upgrade, or some other board-based component that plugs onto your Mac's logic board? Did you stop to notice the weird chrome bag the component came in? Do you know what the weird chrome bag does? No, it doesn't protect the component from light (this isn't beer, after all).

Instead, that bag protects the component from static electricity, the bane of virtually all computer equipment. For that reason, it's a good idea to save those bags. They're great for storing all items that need protection from static electricity.

All a Matter of Size

If you suffer from a visual impairment but

still find the Mac the best computer ever to grace the surface of a desk, don't despair. If you're a teacher and wish you could share the contents of your Mac's screen with the whole class, listen up.

Install and use Apple's CloseView control panel. CloseView lets you magnify any section of your screen by two to sixteen times. That means the visually impaired can more easily use the Mac, and a classroom full of children can benefit from a teacher's lessons at the Mac.

Unfortunately, CloseView doesn't work on Power Macs or with Virtual Memory. Nevertheless, it's a small piece of software that opens a whole new window for many Mac users.

Your Password, Please

If your Mac's attached to a network and you need a password to get access to the various network servers, remember to type your password exactly as you did when you first selected it. Specifically, when you selected your password, you did so in lowercase letters and numbers. That means that each time you type it afterwards, you must do so in lowercase letters and numbers.

What's the problem, you ask? You may, as do many users, inadvertently type your password with either a mixture of uppercase and lowercase characters or all uppercase characters. The result? You get a

dialog box saying you've entered the wrong password. You try again, paying particular attention to the keys you press, but inexplicably that same pesky dialog appears. What to do?

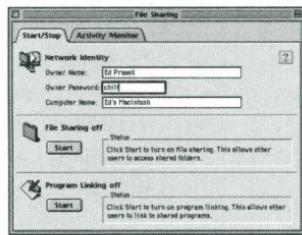
First make sure you don't have the Caps Lock key in the locked position. After that, make sure to enter your password using all lowercase characters. These two precautions will forever prevent the "incorrect password" dialog box from appearing — unless of course you typed the wrong password, in which case you should ... well, that's a different story.

Selling Your Macintosh

There will come a time when your Macintosh will start to seem a little sluggish, a tad cramped, and a bit old. You'll start to flip through catalogs, salivating over the speedy specifications of Apple's latest and greatest. After a quick look at your bank account, you will make up your mind to buy a brand-new Power Mac.

But what about your old Macintosh?

If you have a college-bound child, he or she will certainly appreciate the hand-me-down. However, if you decide to sell your Macintosh, you may be able to get back a sizable part of your original investment. The new Power Macintosh you've set your heart on will now be much more affordable — and you might even use the extra cash to purchase a faster model with more RAM.



The first thing you should do is head on over to the Advantage Computer Exchange Website at www.computerpricing.com to determine the current value of your Macintosh. The Advantage Computer Exchange has a complete database of used-Mac prices, so you'll always know exactly what the fair market value of your computer is.

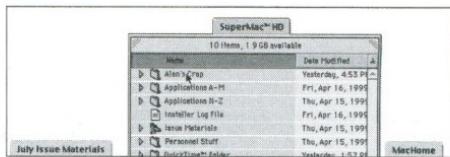
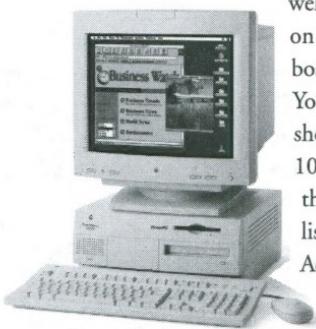
You must then determine how you will sell the computer. In most urban areas, newspaper classified ads work extremely

well, as do postings on local bulletin board services. Your asking price should be about 10-15% greater than the price listed at the Advantage Computer Exchange, to

allow room for negotiation. Be sure that your asking price reflects any additions you may have made to your Macintosh, such as an internal Zip drive or extra RAM. Used-computer buyers are always looking for the next best thing to new, and it is always an advantage if you have your Mac's original boxes, manuals, and receipt.

Pick up the Tab

Is there one particular folder on your Mac you use constantly? If so, you'll love Mac OS 8.x's superhandy feature called Pop-up Windows. Pop-up Windows let you open a folder on your desktop and then drag



the window to the bottom of your screen. As the folder's window disappears below the screen, its title bar turns into a tab. Try it out yourself; open a folder and drag the window to the bottom of your screen. See how the open window becomes a tab? Pretty neat, huh?

Now whenever you need access to that folder, simply click on the tab, and like magic, the window pops open. Click on the tab again and it returns to the bottom of your screen.

A Matter of RAM

If there's one question we get from readers consistently, it's how much RAM can they install in their particular Macintosh. Well, you don't have to wait for your friendly *MacHome* editors to deliver the answer; you can quickly get the information yourself with GURU from Newer Technology.

This handy freeware utility gives you the RAM specifications for every Mac ever built, including clones. With GURU, you can quickly determine how much RAM you can install in your Mac and what

type of RAM you need, among other things. GURU even boasts video RAM information and a nifty diagnostic utility to test the RAM modules installed in your Mac.

Hide and Seek

If you're working on your Mac and want to quickly hide whatever it is you're working on, simply hold down the option key and move the cursor to the desktop. Now just click the mouse button and, like magic, the application you're using instantly disappears. To return to your work, just go to the application menu icon in the upper-right corner of your screen, click on it and select the appropriate application from the menu window.

Magic Startup

Using the Energy Saver control panel, many Macs can automatically start up and shut down. Launch Energy Saver and click on the button marked Scheduled Startup and Shutdown. It's then a simple matter of scheduling repeating days and times when you want your Macintosh to turn on and turn off.

This can be an especially useful feature, for example, if you regularly receive large files via e-mail. Set Energy Saver to start up your Mac every morning at 5:50. Then, set your e-mail application to automatically log on and receive your mail every morning at 6:00, and place an alias of your e-mail program in your Mac's Startup Items folder. By the time you get up, get dressed, and sit down at your Macintosh, all your e-mail will have been downloaded.

Testing, 1, 2, 3, Testing

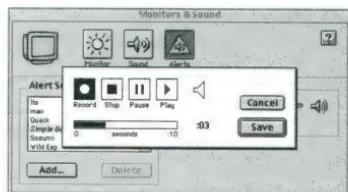
Most Macs come with a microphone, but many users have little idea what they can do with it. If you've ever stared at your

Mac's mic, wondering what good it is, consider these neat ideas:

- You can record your own system alerts. Instead of using the sounds that came with your Mac, simply open the Monitors & Sound control panel, click on the Alerts icon and then the Add button, and record any sound you want. Once you've finished recording your masterpiece, save it and select it from within the Alert Sound window. Now whenever your Mac belts out its alert, you'll hear your recording.

- Use the mic to converse with your Macintosh. Along with Apple's speech recognition software (part of the Mac's system software), you can orally instruct your Mac to perform a wide variety of tasks, such as launching applications, opening and closing windows, and even telling you a joke or two.

- Annotate your word-processing



documents. Many word processors, such as Microsoft Word and Corel WordPerfect, let you record voice annotations that become part of your documents. After you annotate a document, a sound icon appears in the document. To hear the annotation, just click the icon.

- Record messages to send to friends and loved ones. Yes, e-mail is great, but wouldn't it be neat if you could attach spoken greetings to the e-mail you send? Just open the Monitors & Sound control

panel, click on the Alerts icon, and then on the Add button. Record your greeting and save it. From there, open the folder called System inside your System Folder and find the sound you just recorded. Drag it to your desktop, compress it, and attach it to your e-mail. When recipients get your e-mail attachment, they need only double-click its icon to hear it play.

- Record a custom startup sound that plays each time you boot your Mac.

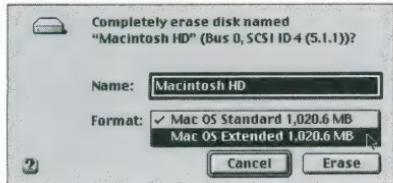
Follow the instructions for recording an e-mail attachment to record your startup sound, but instead of dragging the sound file to the desktop, drag it into the Startup Items folder inside your System Folder.

Now, whenever you start your Mac, you'll hear the sound you recorded.

Should You Switch to Mac OS Extended?

Need more hard-drive space but can't afford a new hard drive? Mac OS 8.1 and later include an improved hard drive file system that can actually reclaim a significant part of your hard-drive space.

The Macintosh's Standard file system



subdivides each disk into small, equal-sized "blocks" to keep track of where data is stored. This block size varies according to the size of the hard disk. On a 500MB disk, the size of a single block is about 8K,

while on a 2GB disk, it is 32K.

This system is highly inefficient, however, because the amount of space a single file requires is a multiple of the block size. Consider that the block size for most 4GB drives is 64K. Any file smaller than 64K, even if it is only 1K, will always claim 64K of space. Since your Macintosh probably has hundreds of files smaller than 64K stored on its hard drive, that's an awful lot of wasted space.

The Mac OS's Extended file system (also known as HFS+) frees this wasted space, making sure that a 1K file claims only 1K of hard drive space. When we reformatted a near-full 3.2GB hard drive with the Extended file system, we reclaimed 500MB of hard drive space.

The Mac OS Extended file system does present a few problems, however. Most notable is that you must back up all your data and reformat your drive to install the new file system. If you don't have a means of backing up all your data, you simply cannot convert to Mac OS Extended — unless you use AlSoft's nifty PlusMaker utility. It lets you format your hard drive to the new HFS+ without backing up your hard drive's contents.

Furthermore, you must boot your Macintosh with Mac OS 8.1 or later to access Extended volumes. If you have a system crash and start your Macintosh with a Mac OS 8.0 or System 7.x CD, you will not be able to access — let alone fix — your Extended volume.

Finally, if you have a small hard drive, there is no compelling reason to switch to

Mac OS Extended. You may only save 20MB of space on a 500MB drive — certainly not enough to warrant reformatting it. If you need extra space that badly, you should consider buying a brand-new hard drive.

World Wide Web Backtracking

If you're one of the thousands who use the newest version of Netscape Communicator or Microsoft Internet Explorer, there's a neat little backtracking feature you might not be aware of. If you visit multiple Websites during an Internet session and want to return to a site you visited early in the session, click on the Back button and continue to hold down your mouse button. Up pops a little window containing all the sites you visited during that session. Select the site to which you want to return, and the browser takes you there.

Finding Files on the Internet

It's happened to all of us: A friend has sung the praises of a new utility that promises to make life much easier but has disappeared before telling you where to download the file. Thankfully, there are several great sites on the Internet that can help you quickly find the file you need.

MacUpdate (www.macupdate.com) and **Download.Com** (www.download.com) offer searchable databases of Macintosh files, from shareware utilities to game demos. In our tests, both sites proved highly reliable, though Download.Com generally found more of our file requests than MacUpdate. On the other hand, MacUpdate tends to perform its file search

faster than Download.Com and goes the extra distance by providing a hyperlink to the file's publisher.

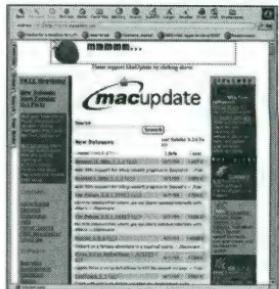
Occasionally, MacUpdate even provides a small screen shot for such items as Kaleidoscope schemes.

Version Tracker (www.versiontracker.com) is the single best place to find new and newly updated software. The site is revised several times a day, with links to the latest updaters, shareware, and beta software releases.

If you're looking for something a little different, hop on over to **Mac OS Zone** (www.macoszone.com). This colorful site showcases new and interesting shareware items each week. You'll also find a library of must-have utilities and a corner dedicated to cool new Kaleidoscope schemes.

Website Tune Up

Many Mac users are catching World Wide Web fever and building their own Websites. And as these fledgling Webmasters discover, the performance of one's site determines whether it's highly popular or barely visited. Factors such as load time, popularity, and design make up a Website's performance rating. To see if your Website measures up, cruise over to www.websitegarage.com and put your creation through its paces. Website Garage determines the performance of a specified



site and then grades the site in a variety of areas. This service is unlimited and free.

A Different Desktop with Every Restart

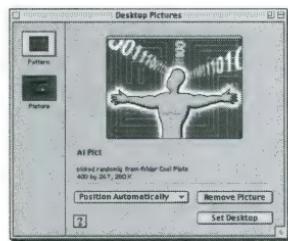
How would you like to see a fresh desktop picture each time you restart? Place a bunch of your favorite pictures in a single folder and then open the Desktop Pictures control panel. Click on the Picture button, and then drag the folder onto the image of the desktop. You should see one of the pictures pop up; below the picture, a note will appear saying, "Picked randomly from folder <name>." Now, every time you restart, you'll see a background randomly picked from that folder.

Clean up Your Mac OS 8 Desktop

Do you have a messy desktop? There's an easy way to fix that with Mac OS 8. In the Finder, click anywhere on the desktop (so long as it's not on an icon). Select View options from the View menu. At the top,

you should see the word "Desktop." Down below, you'll see an option titled "Keep arranged" and a

corresponding menu. If you choose to keep your desktop arranged by name, for example, all desktop icons will be listed alphabetically at the right side of the desktop, instead of being spread about aimlessly. All hard disks, CDs, and printers will be listed at the top, too, to make naviga-



tion much easier. Of course, nothing beats actually filing your documents where they belong, but this trick will do in a pinch.

Ethernet Network vs. LocalTalk LaserWriter

Switching from a traditional LocalTalk network to a much-faster Ethernet network can cause a few headaches; namely, what to do about the LocalTalk-only LaserWriters. The thought of tossing the printer aside and buying a similar, Ethernet-equipped model is a bit hard to swallow. An Ethernet/LocalTalk printer adapter is a better option, but at \$200, it's still not very appetizing.

The good news is that you don't have to pay a cent to maintain compatibility with older LaserWriters. Apple has produced a control panel, LaserWriter Bridge, that does the trick. Hook up your Ethernet network as usual, and keep your LaserWriters networked to the printer port of one Mac. Simply drop the LaserWriter Bridge control panel into the System Folder of that Mac, and you'll be able to print from any Mac on the network.

Refining File Searches

To find a file, many people open Apple's Find File utility (Command-F) and type in their best guess at the file's name. If the search doesn't return anything, some might give up and assume the file to be lost. Others might be frustrated by the deluge of files found matching the name.

Apple's Find File offers several advanced search options that can help you narrow



your search elements and pinpoint that missing file. By clicking on the More Choices button, you can specify up to nine extra search criteria, including file size, kind, type, creator, and creation date. Hold down the option key while clicking the criteria menu to call up even more criteria, including file contents, custom icon, and visibility.

You can find a file without actually knowing any part of its name, too. For example, if you're looking for a 2MB Photoshop file that you created sometime in June last year, just plug that information into Find File, as follows.

Each type of document you see in the Macintosh Finder has its own four-digit alphanumeric code. To tell Find File you're looking for a Photoshop document, you need to know Photoshop's code. Ah, but how do you learn this seemingly technical information? Very easily, actually. Launch Find File and select file type as your first search criterion. Then go back to the Finder and get any Photoshop file. If you drag and drop that file onto the Find File window, you'll see that its file type code has appeared.

Click More Choices to fill in the other search elements: file size (is greater than 2000K) and date created (is within 2 weeks of 06/15/98). Pressing Find should call up a list of matching files, significantly narrowing your search. Unfortunately, even the most advanced search can't help if you've deleted the file!

Controlling the Control Strip

You've no doubt noticed the Control Strip sitting at the bottom left of your Mac's screen. Chances are pretty good you use the strip regularly to change your sound volume or the color depth of your display. However, you may not be aware that you can move the strip to any edge of your screen. Move it by holding down the option key and dragging the strip vertically or clear over to the other side of the screen.

You can also rearrange the order of the Control Strip modules by holding down option and dragging them left or right.

And last of all, you can use the Control Strip control panel to specify a hot key to hide the strip at will — a feature that is especially handy when you're playing games or viewing full-screen graphic files.

Opening Mystery Graphic Files

As you browse the Net, you may find you've downloaded some GIF or JPEG image files that you can't open with your existing graphics applications. You may get bizarre errors noting things such as "bad SOF markers" or "problems parsing JPEG file." This generally happens if you are using an older application that doesn't support newer compression schemes, or if the file was created specifically for PCs. What's the best way to view these files? Drag and drop the image file onto an open Internet browser window. Both Netscape Navigator and Internet Explorer will display GIF and

JPEG images of any variety. While a browser is no replacement for Photoshop, it will do in a pinch for simple viewing.

Saving Your Internet Preferences

There is nothing quite as frustrating as having a major system crash and having to reinstall your system software. Worse yet,

you have to dig around to find the specifics of your Internet account, such as your server's DNS address and phone

number. If you're using Mac OS 8.X, however, you can make your life a whole lot easier. In the File menu of the PPP (Remote Access in Mac OS 8.5), Modem, and TCP/IP control panels, you'll find a Configurations option. From it, you can export your settings for each control panel. Back up the settings files to a floppy. If you should have a serious crash that requires you to reinstall your system software, you can simply import your stored settings. It's a whole lot easier than sifting through mounds of paper looking for your Internet account settings.

Refining Internet Searches

Most Internet search engines, such as Yahoo! (www.yahoo.com), Excite (www.excite.com), and HotBot (www.hotbot.com) can search for Web pages based on both the content and the organization of the keywords you enter. If you search

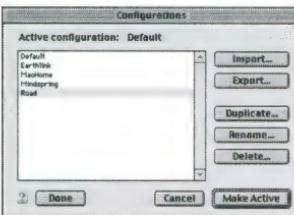
for a multi-word term, such as Star Wars Toys, the search engine will return all pages that contain Star or Wars or Toys. However, if you enclose the phrase in quotes (e.g., "John Doe's Home Page"), the search engine will return only the Web pages that include that exact combination of terms. This nifty little trick can significantly narrow your search.

Organize Your Apple Menu

Although the Apple menu organizes itself alphabetically, it lumps folders, files, and applications all in the same list. The result is an alphabetical listing that fails to group similar items. Wouldn't it be more convenient to place frequently used items near the top of the list and group the folders at the bottom?

It's surprisingly easy to do just that. Go into your System Folder and open the Apple Menu Items folder. Pick out the items that you want to have at the top of the list. Highlight each item and enter two blank spaces before the file name. Once you're finished, find the items you want to appear in the middle of the list — above the folders — and enter a single blank space before each file name.

It's best to leave folder names in the list unedited, so that they stay grouped at the bottom. Otherwise, if you enter a space before the folder names Recent Applications, Recent Documents, and Recent Servers, the system software will immediately create three new folders with the proper spelling. (If you do not wish to see any of these three folders in your Apple menu, go to the Apple Menu



options control panel and set the number of recently recalled items to zero for each folder.) Once you're finished, your Apple menu will be exactly the way you like it.

Auto-Open Applications

Do you find yourself launching the exact same applications the moment you start up your Mac? Claris Em@iler? Netscape Navigator? Microsoft Word? You can save yourself a great deal of time by placing an alias of each application in the Startup Items folder within the System Folder.

You can save additional time by combining several automated tasks. On many Macs, you can set the Energy Saver control panel to start your Macintosh automatically at the same time each day; you can also have your e-mail application check for mail when it launches. My office Mac starts itself every morning at 9:00. Once it's started up, both Netscape Navigator and Em@iler automatically launch. Navigator initiates a connection to the Internet and loads my preferred news page. Meanwhile, Em@iler polls my mail servers for new messages. When I stroll into the office at about 9:15, everything is ready to go. I can read my e-mail, peruse the latest news, and jump into work as soon as I am ready.

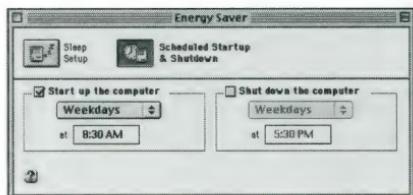
Setting Your Disk Cache

Your Macintosh's disk cache is a section of RAM dedicated to storing frequently used disk directory information. If you open your Memory Control Panel, you might find that the disk cache is preset to something like 96K, 128K, or 256K.

That's actually pretty small these days.. Many people have at least 32MB of RAM, if not more, allowing for much greater disk-cache sizes. To find the recommended size for your disk cache, simply click on the Use Defaults button at the bottom of the Memory control panel, or in Mac OS 8.5, use the Default memory setting at the top of the control panel. The correct disk-cache size will be automatically calculated for you. For example, a 3072K disk cache is recommended for a Macintosh with 96MB of RAM. You should immediately notice improved Finder performance with an enlarged disk cache — windows will list their contents faster, and you'll hear considerably less hard-disk spinning. Note that the default setting also turns on virtual memory (except in OS 8.5) and resets it to 1MB.

Energy Saver Screen Saver

Although I sit at my Mac most of the day, I will sometimes wander away for hours at a time. I don't bother to turn off the computer — restarting the machine when I return is a hassle, and conveniently, the computer automatically fetches e-mail for me while I am away. Unfortunately, the display remains on while I am out, burning electricity and



raising the possibility of phosphor burn-in.

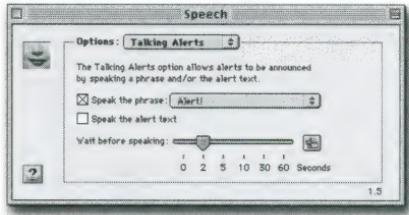
However, I'm not terribly fond of screen savers. I find them frequently intrusive, annoying, and replete with compatibility problems. Thankfully, Mac OS 8's Energy Saver control panel has a simple solution. If you launch Energy Saver, you'll see two buttons at the top: one for Sleep Setup and another for Scheduled Startup and Shutdown. Clicking on Sleep Setup calls up an option to put the system to sleep whenever it's inactive for a specified period of time. This is a great option to save energy, but your computer cannot perform tasks for you when it is asleep. At the bottom right you'll see a

button that says Show Details; clicking on it calls up two additional sleep options. To prevent phosphor burn-in, I click the "Separate timing for display sleep" option and set it to ten minutes. Now, whenever my computer is idle for ten minutes, the display shuts down. No fuss, no muss! Be advised that display sleep works with recent Macintoshes running Mac OS 8. Older Macs may not support the feature.

Talking Alerts

Hey! What are you doing over there? It can be a real pain if you turn away from

your Macintosh for a few minutes and don't notice that an alert message has appeared. Your LaserWriter might have run out of paper, your modem might not be responding, or perhaps an application has unexpectedly quit. With Mac OS 8.x and Text-to-Speech, however, you can have your Macintosh speak alert messages. Simply open the Speech control panel and select Talking Alerts from the options menu. You can have your Macintosh say one of several preprogrammed alert phrases, or you can create your own. You can also have your Mac speak the entire alert message, so you'll know what the problem is without having to turn your head.



Quick Links

With Netscape

Communicator 4.5, say you're reading an e-mail message from a friend. She brings up the topic of exotic coffees and wants to know where she can find online information about rare beans. Netscape Communicator 4.5's quick find/link feature makes locating new Websites a breeze. Simply highlight "exotic coffees" in the e-mail message and drag and drop the text clipping onto an open Communicator 4.5 window. The browser will automatically perform a search for Websites pertaining to that topic.

You can locate specific sites in Communicator 4.5 by dragging and

dropping text clippings. If you're in Microsoft Word and you happen to be writing an essay on Nike's market dominance, you can simply drag the word "Nike" onto an open Communicator window. Communicator will automatically take you to the Nike Website.

Early Bird Gets the (AutoStart) Worm

AutoStart 9805 is a nasty infection that can cause data loss in the worst case. Technically, it's called a "worm." Unlike a virus, a worm is a self-contained application that duplicates itself rather than infecting other applications.

AutoStart 9805 is typically spread via CD-ROMs and abuses the AutoPlay feature of QuickTime 2.0 or higher. When an infected CD is inserted into your Macintosh, the worm is automatically launched. It copies itself to your hard drive and then automatically reboots your Macintosh. Once your Macintosh has started up, the worm launches itself. Every 30 minutes or so, it polls all mounted hard drives to search for uninfected disks. Should it find one, it copies itself onto that drive.

AutoStart 9805 is only destructive in specific circumstances. After the application checks mounted volumes, it will start a search for files with specific endings, such as "data," "cod," "csa," and "dat." Any files matching the criteria will

be overwritten with random data.

Early Bird is a freeware AutoStart 9805 worm antidote from Jim Kreinbrick. The latest version has been updated to detect recent strains of the AutoStart worm, and can be found at www.lineaux.com/notes/worm_intro.htm.

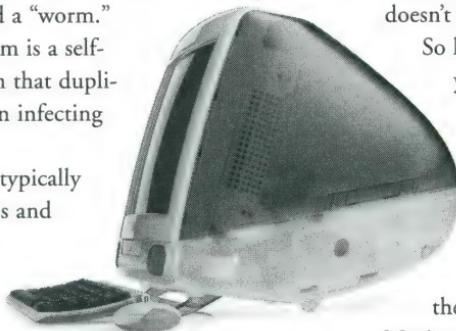
Printing from the iMac

How do you print from an iMac? You've probably heard that the iMac doesn't have serial ports.

So how do you use your trusty old printer with it?

The iMac uses USB (Universal Serial Bus) ports rather than the traditional

Macintosh serial ports to connect to printers. However, many manufacturers are offering adapter cables to connect older printers to an iMac USB port. Epson sells the USB/Parallel Printer Adapter for \$50; it'll work with a Stylus Color 600, though it goes between the iMac's USB port and the 600's parallel port (the 600 has both parallel and Mac serial ports). Hewlett-Packard sells the Printer Cable Kit for iMac, which lets you print to its DeskJet 670 and 690 series printers; the cable also goes from the USB port to those printers' parallel ports. (They don't have serial ports.) Other manufacturers are working on USB-to-Mac serial adapters for printers that don't have parallel ports.



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You
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Easy Answers for Hard Questions

Breaking the Speed Limit

QI've been considering Speed Doubler 8 from Connectix, but I'm a little confused. Every catalog ad I've seen has disclaimers like "according to Connectix tests." There seems to be little doubt that Speed Doubler 8 boosts the performance of Macs using the Motorola 68K family of processors, but some doubt about its advantage when running on a Power Mac. Can you help sort this out?

AActually, it's just the opposite. While Speed Doubler 8 boosts file-copy and disk-access performance on non-Power Macs, it also has a dramatically faster 68K programming code emulator for Power Macs. Speed Doubler 8's emulator lets Power Macs recognize and execute programming written for the Motorola 68K family of processors used in non-Power Macs, and it does so much better than the emulator Apple builds into the Mac OS. That means you get Speed Doubler 8's full capabilities when using it on a Power Mac system.

As for the disclaimer, many factors (software and hardware configurations, for example) affect Speed Doubler's performance. The disclaimer simply lets you know your performance may vary based on the characteristics of your particular Macintosh. But regardless of how your Mac's configured, you will see speed improvements, especially when it comes to copying files, accessing your hard drive, and executing non-Power Mac (non-native) programming code.

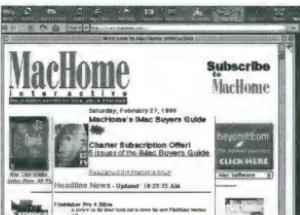
How Fragile Is It?

QI have a Performa 6400/180, and sometimes when I'm on America Online, the screen freezes. The only way to regain control of my Mac is by pressing the Command-Shift-Power key combination. When my Mac finishes restarting, I get a message saying I shut down improperly. How much serious damage can I do to my Mac using this key combination to restart?

ADon't worry. You can't harm your Mac by pressing the Command-Shift-Power key combination. Apple designed the Mac with that key combination to get you out of just the sort of freezing problems you've been experiencing. If you want to avoid the warning, however, you can turn it off in the

General Controls control panel.

That said, I'd call America Online for assistance with



your freezing dilemma. With a little luck, they'll be able to isolate your problem and help you with a quick fix. In a worst case scenario, delete the America Online preferences from your Preferences folder inside the System Folder, and then reinstall your AOL software.

Reinstalling the AOL software overwrites the copy on your hard drive, but the installer doesn't overwrite the AOL preference files. That's why I suggest delet-

ing them before reinstalling the software.

Before performing the reinstall, however, make sure to back up any AOL e-mail messages you wish to keep. Otherwise, you'll lose them forever.

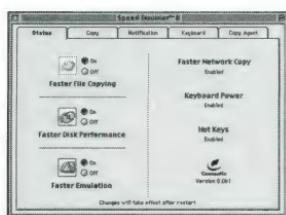
Shattered Images

Q Sending graphics as attachments to my e-mail doesn't work most of the time. Those to whom I send images report that the images are garbled and unviewable upon receipt. Is there a way to fix this problem?

A Sure there is, but first a bit of information. The Internet only understands plain text data; it doesn't understand digital data. The images you're sending through cyberspace are digital data. That means they must first be converted to text

data before they embark on their trip across the information superhighway.

How do you convert your



images? You don't have to. Your e-mail application automatically takes care of the process for you. And the recipient's e-mail application takes care of converting them back to their original form. It all happens in the background without your even knowing it.

Most likely, your problem arises because of incorrect encoding. If you're sending an attachment to another Mac user, make sure your e-mail application is set to use BinHex

encoding. If you're sending attachments to Windows users, use AppleDouble or Base64 encoding.

Also, before you send any file as an attachment, it's best to compress it first with a utility such as StuffIt. Doing so makes the attachment smaller, meaning it takes less time to upload and download. And in compressed form, your attachment stands far less chance of being damaged as a result of its ride through cyberspace. When compressing files that you intend to send to people using a PC, use the shareware utility ZipIt. ZipIt compresses files in the .zip format used widely in the PC world and also decompresses .zip files.

If you don't have StuffIt, you can download the freeware version, StuffIt Expander, from most online services and the World Wide Web. Ditto for ZipIt. To compress files, you'll need the shareware title DropStuff, also available on the World Wide Web.

For the Long Haul

Q I purchased a Power Computing PowerCenter Pro 180 with a Jaz drive and recently read an article that said Zip- and Jaz-style media aren't suitable for archival storage. If that is so, what's a good, long-term storage medium for photographs?

A Zip and Jaz media are great for long-term storage, but they can fail — as can virtually every storage medium. Zip and Jaz cartridges sometimes, though rarely, have manufacturing defects, or you might

damage a cartridge if you drop it. Of course, these problems occur with any product, storage media or otherwise.

That said, however, I'd go with CD-ROM for digital-image storage. CDs last hundreds of years, aren't easily damaged, and hold 650MB of data. For less than \$400 you can get a CD recorder and burn your own CDs for pennies per megabyte.

How Zippy Is the Zip?

QI recently added an external Zip drive to my aging Macintosh Performa 575. Can I install system software onto a Zip cartridge and then boot from it instead of from my Mac's internal hard drive? That way, when my hard drive eventually dies, I can still use my Mac without spending big bucks on a replacement hard drive.

ANovel idea, but forget about it. The Zip drive, as nice as it is, is far too slow to use in the manner you suggest. Specifically, a Zip drive is about twice as slow as a hard drive, and sometimes almost three times as slow, depending on the speed of the hard drive you use for comparison. You'd go nuts just waiting for your Mac boot.

That said, you'll find today's hard drives quite reasonably priced. In fact, for only a few dollars more than a Zip drive, you can get a high-capacity, speedy internal hard drive with which to replace your current internal drive.

I commend you, though, for preparing for the inevitable. And since you're aware

that your hard drive will die sooner or later, concentrate on meticulously backing up its contents. Replacing a hard drive is easy; replacing its contents isn't.

A Better Desktop

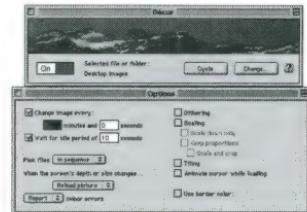
QMy friend who has a PC keeps asking me why I can't use wallpaper or pictures on my Mac's desktop. I'm sure there's software that lets me use a picture on my desktop instead of the desktop patterns that came with my Mac, isn't there?

AIndeed, here is a nifty little program that'll let you display any picture you want on your desktop. Heck, with this fabulous utility, you can even do something your PC-owning friend can't: Rotate the images that appear on

your desktop.

The name of the utility is Décor by François Pottier. This \$10 shareware program lets you use any image you want as a replacement for desktop patterns. And more than that, you can create a folder of desktop images and have Décor rotate among them at specific times. That's something that'll send your PC-owning friend into a hissy fit. You can get Décor from our Website at www.machome.com.

By the way, Mac OS 8.x comes with a control panel called Desktop Pictures that



also lets you use a picture, or pictures, as a replacement for the Mac's desktop patterns. However, as nice as this new control panel is, it's not as versatile as Décor.

Exposing Invisible Files

Q Is there a way to make invisible files stored on my Mac's hard drive visible? If so, can I then alter these files (e.g., copy or delete them)?

A The Disk Editor utility built into Norton Utilities from Symantec lets you make invisible files visible. However, I would recommend using it only to delete the desktop database files, Desktop DB and Desktop DF, as part of the desktop-rebuilding process.

Apple's software engineers make some files invisible for a reason, primarily to protect us from ourselves. It's the old adage: out of sight, out of mind. Invisible files, for the most part, are crucial to the operation of your Mac. Messing with them without understanding what they do is just asking for trouble.

Caps Lock Dilemma

Q I have a problem: I keep engaging my PowerBook's Caps Lock key by mistake. I read in your magazine about some software that would disable this key, but I can't find it. Could you please help me? It would sure make life easier.

A Take heart; there's a small utility that'll help you out. It's a shareware title called OptionCapsLock. Written by David

Sumner, OptionCapsLock renders the Caps Lock key useless unless you press it in conjunction with the Option key.

You can download OptionCapsLock from any online service on the Web.

Custom Startup Screens Revisited

Q A while back you gave advice on how to change the Mac's startup screen. Do you remember which issue had that information?

A Instead of referring you to some past issue, I'll just repeat those instructions. Simply open the image you want to use as your startup screen in an image-editing application. Make sure, however, that your image editor supports the StartupScreen or PICT Resource file formats. The startup screen must be in one of these formats for the Mac to recognize it.

With the image open, use the Save As command to save it in the StartupScreen or PICT Resource format, and rename the image StartupScreen. Then, place the StartupScreen file in your System Folder and reboot your Mac. You should see the new startup screen as your Mac boots.

Quirky Modem

Q Can you tell me why my brother-in-law gets bumped off the Internet completely? This seems to happen a lot and then he has to reconnect all over again.

A A few things could be causing your brother-in-law's problem. For one, does he have Ma Bell's Call Waiting feature?

If so, the Call Waiting beep that lets him know about an incoming call will cause his modem to disconnect. Disabling Call Waiting, however, fixes the problem. He must open the online software he's using and, depending on the code used in his area of the country, type either 1170, or *70, (yes, he's supposed to include the comma) in front of the phone number his Mac dials to log on to the Internet.

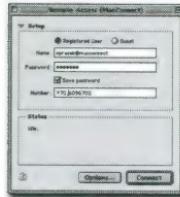
If Call Waiting isn't the problem, it might be a matter of poor-quality phone lines. Many areas of the country have out-

dated phone equipment that, though fine for voice communication, is below par for modem communication. Static across the line — any static — will cause an online connection to

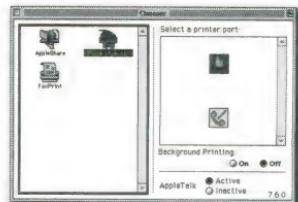
drop quicker than you can say "the Mac is great." If your brother-in-law determines static to be the problem, switching his Internet service provider (ISP) may provide relief, but there are no guarantees. That's because different ISPs use different routes to the phone company's central office hub.

The Long Wait

Q Whenever I try to print to my Hewlett-Packard printer, the data gets spooled to my hard disk. The hard disk labors for many seconds, and then finally my printer begins printing. Is there a way to spool my print data to RAM instead of to the hard drive, which should provide faster printing times?



A Unfortunately, you can't spool your print data to RAM. If you launch your Chooser and look at the bottom-right side of the window, you'll notice you have the Background Printing option turned on. Background Printing works by spooling data to a temporary file on your hard drive. When finished creating the spool file, your Mac feeds the data to your printer in the background while you continue working.



You can decrease the amount of time it takes to print a document by disengaging Background Printing. To do so, simply launch the Chooser and click the Off radio button. From that point forward, your Mac sends print data direct to the printer instead of to a temporary spool file. Be aware, however, that then you can't use your Mac while it's printing.

Where's My Scanner?

Q I recently purchased a new Power Mac to replace my Mac LCII. Unfortunately, I haven't been able to get my scanner to work. Every time I try to use it, I get a message that says "can't find the plug-in." I know I'm doing something wrong; can you help?

A It sounds like you didn't install your scanner's software when you switched to the new Mac. That would explain the

error messages you've been receiving.

The plug-in to which the error message refers is a special piece of software used by your image-editing application to communicate with the scanner. Without it, your image editor knows the scanner is there but doesn't know how to communicate with it.

That said, simply install your scanner's software, making sure to place the plug-in in its appropriate location within your image editor's folder (usually inside another folder called Plug-ins).

If, however, you did install the software, make sure the plug-in is in the right folder. If your scanner's plug-in isn't in the right folder, it won't load when you launch your image-editing application, and you won't be able to use your scanner.

Performa Printing Slowdown

QEvery time I print a file from my Performa 5200 to my Epson Stylus Color 600 and then get involved with other activities on my computer, I get printing delays. Pages that would ordinarily print in no time seem to take forever. How can I avoid these delays?

AUnfortunately, the only way you can avoid delays in printing is to avoid doing anything else while your Performa prints.

The problem has to do with how the Macintosh assigns priorities to computing tasks. When you print a file, the application sends it to the PrintMonitor. The PrintMonitor has a very low computing priority, however, and can use the processor only when it is not being used by

another application. When you start browsing the Internet, your Web browser is given computing priority. As a result, the PrintMonitor must process your print job in those brief moments between the time a Web page is fully downloaded and the time you request a new Web page.

Adding to the problem is the speed of your processor. While the 75MHz PowerPC processor at the heart of your Macintosh is doing its best to perform multiple tasks, it simply cannot keep up with your computing demands. Your best bet is to wait patiently for the print job to finish.

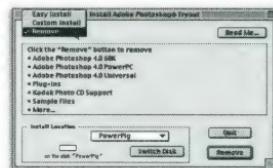
Easy Uninstall

QI'm a new user and I'm searching for the proper way to uninstall an application that I've just installed. Please, as technically painless as possible!

AIn most cases, the simplest and most effective way to get rid of an application is to locate its folder in the Finder and drag it into the trash.

Unfortunately, the application's Installer might have installed control panels, extensions, or other specialized items into your System Folder. If your Mac began to behave erratically after the software installation, you should remove these items as well.

Application Installers that install system components often include an uninstall option, which gets rid of absolutely every-



thing they installed. You should check the application's Installer to find out if it has a Remove or Custom Remove option listed in the menu where you usually see Easy Install. If it does, select Remove (or select Custom Remove and check all items you want to get rid of) and press Return. Your Mac should be restored to its previous condition.

Injured Volume

QI recently installed Norton Utilities. When I used it to check the hard disk, I received the following message: "The Volume Bitmap is incorrect." What is the Volume Bitmap and how does it get damaged? If it is not fixed, what kinds of problems will it cause?

AThe Volume Bitmap is a file on your Macintosh's hard disk that tracks which parts of the disk currently contain information. Errors in the Volume Bitmap usually creep in when an application crashes as it is writing a file, or when your Macintosh is shut down improperly after a system crash. If the Volume Bitmap is damaged, your Macintosh is not fully aware of all the data on your hard drive. That may lead to one file overwriting another file, resulting in lost data. Therefore, it's always a good idea to fix Volume Bitmap errors as soon as you discover them.

The Sound of Silence

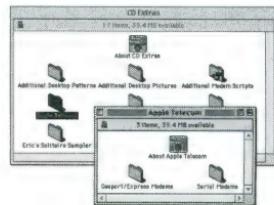
QWhenever I put an audio CD into my Performa 637, I get an error message stating the disc is not recognizable.

I have tried copying the AppleCD Audio Player from my Performa System CD, but this doesn't seem to work. Can you help me hear my audio CDs again?

AIn order to recognize audio CDs, your Macintosh must have a file named Audio CD Access installed in its Extensions folder. If you have occasionally used the Extensions Manager to adjust the set of control panels and extensions that load at startup, you may have accidentally turned off Audio CD Access. You should be able to find this file on either your hard drive or your Performa System CD by using Find File under the File menu. Then simply drag the file into your Extensions folder, reboot, and pop in an audio CD. (If you cannot locate the file, you can download the very latest Apple CD-ROM software from either www.apple.com or Apple's America Online forum.)

Telephone Line Is a Lifeline

QI have a Macintosh Performa 6400/200. I've installed Mac OS 8 three separate times, but after installation I cannot get back online. I have spent many hours on the phone with Apple tech-support people and they have never been



able to solve the problem. Apple gave me solutions, but when I tried them, they simply didn't work.

A You're in luck. I had to deal with this exact same issue not six weeks ago. The problem is that Mac OS 8.0 doesn't install the Apple Telecom 3.0 software required to operate your 6400's internal Express Modem. You can find Apple Telecom 3.0 on the Mac OS 8.0 CD, within the CD Extras folder. After you install it, your modem will once again respond normally, and you'll be able to surf the Net as you please.

Finicky Switchbox

Q I recently bought an EasyPhoto Reader scanner, but ever since upgrading to Mac OS 8 (and now Mac OS 8.1), I cannot get it or any other serial device plugged into my serial port switchbox to work. The switchbox worked fine when I was running System 7.5.5. What's the problem?

A I'd bet my bottom dollar you're not using the proper cable between your switchbox and your Mac's serial port. Many people mistakenly use a regular old serial cable to attach a switchbox to their Mac. Although it may work under some circumstances, it won't work under all circumstances.

What you really need is a pass-through cable. It looks just like a serial cable but is wired to allow your Mac to communicate with the devices plugged into the switchbox.

Most switchboxes don't come with a cable of any kind, pass-through or otherwise. If you buy the wrong type of cable, you get inconsistent results.

But take heart. Pass-through cables are readily available and inexpensive. You can probably get one at a local computer store, but if you can't, order it through one of the Mac mail-order companies.

PRAM Mishaps

Q I have had a Performa 6300 since June 1997. Since November, I have had to set the date, time, and printer port every time I start my computer for the day. Yet if I do a restart, things don't seem to get out of whack. I'm completely baffled, as nothing I have tried has corrected this problem.

A Having to reset the date and time each time you start your Macintosh is a sure sign that your logic board's battery has died. This battery keeps the system clock running and powers the parameter RAM (PRAM) when your computer is turned off. PRAM stores important preferences, such as your choices of printer port, system sound, and startup disk. If the battery fails, you have to set these preferences every time you start your computer. However, as you have noticed, the preferences remain through a restart. During a restart, the computer isn't actually shut off, so the PRAM is still powered by the computer's power supply.

You can purchase a replacement battery from a local computer store. Remove the three screws at the back of your Performa 6300 and, using the wire handle, pull the logic board from the Performa case. The battery bracket should be obvious; simply

exchange the batteries, replace the logic board, and close up your Mac.

If your Macintosh is still under warranty or you're just not comfortable opening your Macintosh, have an authorized service provider install the battery for you.

Those Needless F-Keys

QA recent issue of *MacHome* had an interesting article on confusing keyboard items. However, you did not mention F13, the Print Screen button, which does not seem to work. Can you tell me how to get a print of the screen?

AApple designed its extended keyboards to be functionally identical to PC keyboards because Macs needed to connect to local area networks widely used in the corporate world. In this environment, F13 is universally accepted as the Print Screen key, dumping the textual content of any terminal computer to a local printer. So like F14's Scroll Lock and F15's Pause, F13's Print Screen became a mainstay of the Apple extended keyboard.

To print the contents of your Mac's screen, you need to capture a picture of it by pressing Command-Shift-3. You will find the picture file, called "Picture 1," in your hard drive folder. Then just double-click on the Picture 1 icon to open the screen image, and select Print from the File menu in the menu bar.

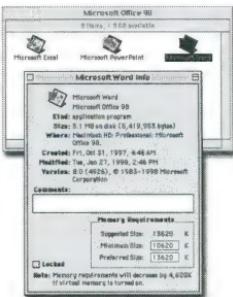
Ambrosia Software's Snapz Pro utility offers a more elegant solution, however.

You can customize Snapz Pro so that it takes a picture of the screen when you press F13, and you can opt to send the image straight to the printer. That way, the Print Screen key actually does what it claims to do. Get Snapz Pro at www.ambrosiasw.com.

A Difficult Assignment

QTo allocate more RAM to an application, I have been doing what the manual tells me. However, when I call up the Get Info window, the options to change the preferred and minimum memory allocation are not available. It happens with most, but not all, programs. Why do I sometimes get the right Get Info panel, with changeable memory boxes, and at other times not?

AFrom your description, I suspect you are trying to change the application's RAM allocation while that application is running. When it is launched, an application is assigned the amount of RAM listed in the Preferred Size box of its Get Info window, unless



the RAM isn't available. If it isn't, the application is assigned the Minimum Size. The current Mac OS does not let you adjust those values while the application is active. You not knowing whether an application

was open or closed may be the reason you could change your RAM allocation at some times but not others.

An easy way to tell the status of an application is to look at its icon; if it is grayed out, the program's running. Quit the application, highlight its icon, call up the Get Info window (Command-I), and change the amount of RAM in the Preferred Size box. Once you relaunch the application, you'll have more room to breathe.

All a Matter of Sound

QI've installed Mac OS 8 successfully into my PowerCenter 150, but the startup chime is exactly the same as the one I had when running System 7.6.1. I know it's supposed to be different, because my friend's Mac with Mac OS 8 boots with a different startup sound. What should I do?

AYou don't need to do anything — actually, you can't do anything. The startup sound isn't part of the system software, but rather is programmed into your Mac's ROM chip. Therefore, you can't change it.

Each model of Macintosh has a different startup sound. Some have the sound of a strummed guitar, others a simple chime, and still others have a synthesizer-type startup sound. That explains why your friend's Mac sounds different from yours: He or she has a different Mac model.

GeoPort Good as Gold?

QI recently bought a GeoPort Telecom Adapter, loaded all the software into

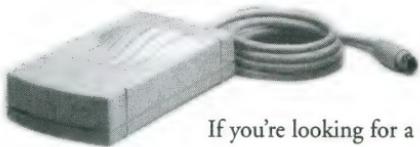
my Power Macintosh 6100/60AV, and restarted. When I logged on to my ISP, the PPP control panel revealed that I had connected at 26,400 to 28,800 bps each time — yet Web pages only loaded at an astounding 6 or 8 bps. Additionally, my entire computer slowed down. Windows opened at a snail's pace, and scrolling took forever. I put my Global Village Gold modem back on, and it works perfectly. Got any ideas?

AI'm afraid there's no happy answer to your question. The GeoPort Telecom Adapter isn't actually a modem; rather, it's a simple analog-to-digital converter, which, when combined with Apple's Telecom software, allows your computer to mimic the functions of a real modem. The unfortunate side effect of this technology is that it requires a great deal of your computer's processor time. According to MacBench 4.0, a Power Macintosh 6500 with a 250MHz PowerPC 603e processor slows down by

a whopping 40% when the GeoPort Telecom Adapter is in use. Your Power Macintosh 6100 is considerably slower than a Power Macintosh 6500, which is why it grinds to a halt while the GeoPort Telecom Adapter is active. Your computer just can't keep up with the heavy processing demands. That leads to the question, Why is Apple selling a modem doppelgänger that cripples the computer it is attached to? The original intent of the GeoPort Telecom Adapter was to provide inexpen-

sive, high-speed connections at a lower cost than traditional modems.

Unfortunately, this dream failed to consider the technology's heavy processing demands. Only the fastest Macs can use the adapter without serious slowdowns.



If you're looking for a faster modem, my advice is to buy just that — a real modem. There are plenty of high-quality 56K modems now available, and although they are more expensive than the GeoPort Telecom Adapter, they will not slow your computer in the least.

Unwanted Guests

QI have a strange problem. I deleted several fonts from my hard drive a few months ago. However, every time I use an application, I still see a long list of fonts that should no longer be on my drive. I thought when I upgraded to Mac OS 8 I'd be rid of these die-hard fonts once and for all; sadly, that's not the case. How can I finally be rid of these ghostly reminders of fonts that are long since trashed?

AThere may be two things at play here. First, the Mac OS automatically installs several fonts, among them Times, Helvetica, Geneva, Monaco, Chicago, Charcoal, Courier, and Symbol. If you removed any of these fonts, they would

certainly be reinstalled when you installed Mac OS 8.

Second, you may have removed only one component of the font. There are two types of fonts widely used on the Macintosh — TrueType fonts and PostScript fonts. Whereas TrueType fonts are self-contained in a font suitcase, PostScript fonts have two separate components — a font suitcase that contains the screen font, and another file that contains the printable font. I suspect that you have thrown away PostScript printable fonts but not the accompanying PostScript screen fonts. That would explain why the fonts still appear in your font menu.

Go back to the Fonts folder within the System Folder and look for font suitcases with the same names as the fonts you want to remove. Trash those suitcases, and you should be rid of the fonts forever.

Moving Day

QWe're moving next week and the professional movers have advised us to "park" our Macintosh's hard drive before the move. This is not addressed anywhere in the owner's manual. How do we go about parking our hard drive?

AA hard drive is remarkably similar in concept to an old record player. Inside the small metal casing are a disk that spins and an arm that reads the data from the disc. When you turn off power to a record player, the needle comes to rest on the disc. Now, if you leave the needle in place and pick up the record player, chances are pret-

ty good gravity will take over and the needle will slide across the disc, scratching it and potentially resulting in crummy sound.

In the early days of computer hard drives, the read/write arm also stayed put when the hard drive was powered down. If you were to pick up the computer and move it, you risked having the read/write head slide across the disk and corrupt its data. To travel safely with older hard drives, you needed to send the hard drive a command that told its read/write arm to "park" itself at the side of the disk — much in the same way you would clamp the needle arm of a record player at the side of the turntable.

Modern hard drives automatically park their read/write heads when they are turned off. The hard drive in your Macintosh needs no special treatment during your move. Just turn the computer off as you would normally and package it in its original box to ensure safe transit.

Wake Up!

Q My Macintosh frequently takes a long time to wake up, even if I've only been away from it for a few minutes. A friend told me that it could be the new AutoStart 9805 virus, and that it may have gotten in on the back of a music CD. What can I do to see if I might have such a virus, and how can I get rid of it?

A AutoStart 9805 is a particularly nasty infection that can cause data loss under certain conditions. It's called a "worm,"

which, unlike a virus, is a self-contained application that duplicates itself instead infecting other applications.

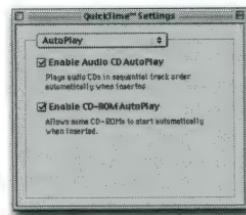
AutoStart 9805 is typically spread by CD-ROMs and abuses the AutoPlay feature of QuickTime 2.0 or higher. An application known only as "DB" hides quietly on the CD. When this CD is inserted into your Macintosh, the application automatically launches. DB copies itself to your System's Extensions Folder and renames itself "Desktop Print Spooler." (The Desktop Printer Spooler is OK, however, and is not a sign of the worm.) It will then automatically reboot your Macintosh.

Once your Macintosh has started up, Desktop Print Spooler launches itself. Every 30 minutes or so, it polls all mounted hard drives to search for uninfected disks. Should it

find one, it copies itself to that drive.

Thus, if a system infected with AutoStart 9805 is used to create a CD-ROM, it too will be infected, and through mass distribution, the CD-ROM will spread the worm.

AutoStart 9805 is only destructive in specific circumstances. After the application checks mounted volumes, it will start a search for files ending with "data," "cod," "csa," and "dat." Any files matching the criteria will subsequently be overwritten with random data.



To prevent infection of your system, you must disable the QuickTime AutoPlay feature. Within the QuickTime Settings control panel of QuickTime 2.0 or newer there is an AutoPlay option. Simply uncheck Enable CD-ROM AutoPlay to protect yourself.

If you've popped a CD-ROM into your Mac and the computer mysteriously restarted itself, or if you notice bizarre disk activity every 30 minutes, you may have contracted AutoStart 9805. Virus checkers such as SAM and Virex will cleanse your system, so long as you have the latest virus-definition files.

It's important to note that standard audio CDs cannot carry the worm, because they are not true Macintosh volumes. Don't worry about playing them in your Macintosh; they cannot cause your system any harm.

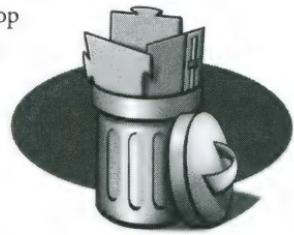
But in the final analysis, it appears that your system may be suffering from ambitious energy-saving settings. Your hard drive may be spinning down after a short period of inactivity. When you sit back down at your Macintosh, the hard drive requires some time to spin up before it can be used again. To minimize your discomfort, check the Energy Saver control panel and make sure your hard drive is set to sleep only after 30 minutes of inactivity.

Trash It!

QI've got a Power Macintosh 6500/225 running Mac OS 8, and I'm having a problem. After dragging something to the Trash, a dialog box comes up that

says "File xxx cannot be left in the Trash. Do you want to delete it immediately?" I click OK, but after I restart my Mac, the problem still exists. Can you tell me how to get rid of it?

AEvery Macintosh hard drive with a System Folder contains two invisible files called Desktop DB and Desktop DF. These files contain the organizational information of your Mac desktop, including where your icons are and what they look like. An error such as "File xxx cannot be left in the Trash. Do you want to delete it immediately?" is a symptom of corrupt Desktop files.



The first thing you should do is reboot your Macintosh while holding down the Option and Command keys. That will initiate a rebuilding of the Desktop files. If all goes well, afterward you should be able to delete the file in the Trash without further problem.

However, if it doesn't work, you should run either Apple's Disk First Aid, Norton Utilities for Macintosh, or TechTool Pro 2. It is possible that a deeper level of corruption has affected your hard drive. One of these hard-drive repair programs should be able to correct your problems with ease.

More Megahertz

QI am considering upgrading my PowerBook 1400cs, but I have two worries. First, can I change the hard drive in the 1400? Second, I'd like to upgrade to a G3 processor. I find the computer gets quite hot with a mere 166MHz processor and I wonder whether a more powerful unit wouldn't just burn itself out.

AThe PowerBook 1400 is equipped with a 2.5-inch IDE hard drive. You can replace the drive with any 2.5-inch IDE drive, the largest of which is currently 8GB. And you needn't worry about your processor overheating. The design of the PowerPC G3 processor is quite different from the PowerPC 603e in your PowerBook. While the G3 runs much faster, its power consumption and heat output are similar to the 603e. Your PowerBook is likely to run just as warm with a G3 processor, but it will not melt down into a ball of smoldering plastic and silicon.

It's Not Simple

QI recently visited an informative Web page and saved it as text to my hard drive. Once offline, I tried to open the document and got the following message: "This document is too large to be opened by SimpleText." How can I open this document?

ASimpleText has a rather constrictive file-size limit that prevents it from opening larger documents. As the error suggested,

the document you saved was simply too long to be opened by SimpleText. You can, however, open this document with another application, such as ClarisWorks or Microsoft Word. Simply drag the file onto the application of your choice to view it.

It's Attached

QRecently several of my Windows-using friends have sent me e-mail with attachments labeled with the suffix ".exe." I have been told that this suffix stands for "binary executable." I can't open these files on my Mac. StuffIt Expander gives me a message saying, "Either this zip/gzip file is damaged or this is not a zip/gzip file." Double-clicking the file gives the message: "cupid4p.exe could not be opened because the application 'DOS' could not be found. Could not find a translation extension with appropriate translators." Is there a way to read these binary-executable attachments on my Mac?

A"Binary executable" is the technical term for an application written for use within DOS or Windows operating systems. When you launch an application on your Macintosh, specific instructions are sent to the PowerPC processor. Likewise, when you launch an application on a PC, instructions are sent to its processor. But PowerPC and Pentium



processors don't understand the same set of instructions. When you try to double-click a binary-executable file on the Macintosh, the PowerPC processor can't make heads or tails out of the code it's reading. You cannot open such files on your Macintosh unless you install a PC emulation program, such as Virtual PC or SoftWindows, which translates instructions intended for the Pentium processor into instructions the PowerPC can understand.

Mac to Windows

QI want to do word processing with Microsoft Office and then send the file to another person via America Online. Problem is, my friend has a Windows machine. Is there some sort of conversion built into my Mac that will allow me to do this?

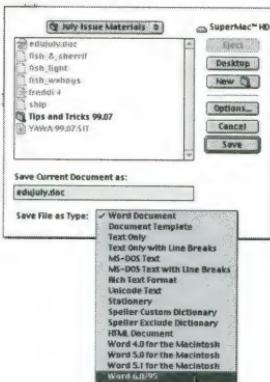
AThe conversion is actually built into Microsoft Word. After you prepare your document, select Save As from the file menu. At the bottom of the Save dialog box, there's a "Save File as Type:" box. One of its options should be Word 6.0/95; select it and save your file. Now, launch your America Online software and create a new message. In the top right of the message window, you should see an Attach Files button. Click on it, and find the file you just saved in Microsoft Word. At the bottom of the Attach Files dialog box, you'll see a Compress Attachments option. It is important that you do not opt

to compress attachments; if the file is compressed, your Windows friend will not be able to decompress it. Click Send Now to fire off the file. So long as your friend has Microsoft Word for Windows version 6.0 or later, he or she will be able to read your file.

Ooh, iMac!

QI am considering getting a shiny new iMac. I currently own a Performa 6200CD. I have three SCSI devices that I use often: a flatbed scanner, a SyQuest Syjet 1.5GB drive, and an Iomega Zip

drive. I understand the iMac does not include a SCSI port. Will there be some type of device available that will allow me to connect these devices to an iMac?



AYou're out of luck. Although

the iMac's USB (Universal Serial Bus) ports are much faster than traditional serial and Apple Desktop Bus (ADB) ports, they are significantly slower than SCSI. A USB-to-SCSI adapter is thus impossible, and, consequently, you will be unable to use your SCSI devices with the iMac. USB adapters are being made for both serial and ADB devices, however. You should be able to hook any existing printers, digital cameras, or joysticks to the iMac without difficulty.

Home Networking

QI have three Macs and a LaserWriter networked with PhoneNet connectors. I would like to add a StyleWriter 6500 to the network. Everything I've read says I have to either turn off AppleTalk or network the printer through the modem port of one Macintosh. Is there any way around this?

AAs you have found, the StyleWriter 6500 does not have built-in AppleTalk capability and therefore cannot be networked in the traditional manner. However, Apple's Printer Share software allows you to connect the printer to the network through the modem port of one of your Macs.

(Printer Share is a standard part of Mac OS 8 and also should have shipped with your

StyleWriter 6500.) Technically, the printer isn't really being networked — it's being shared by the Mac to which it's connected. When you print to the StyleWriter 6500 from one of your other two Macs, the Mac connected to the StyleWriter will slow down as it routes the data to the printer. It's not a perfect solution, but it works.

A \$199 Ethernet adapter is available for the StyleWriter 6500; however, it requires you to upgrade your network from



PhoneNet (LocalTalk) to Ethernet, and that can be costly.

HFS: Where's the Plus?

QI have a Power Macintosh G3 with Mac OS 8.1. Norton Utilities 3.5.3 works perfectly with this machine. Yet when I install it on a PowerBook G3 with OS 8.1, I get the message "Norton Utilities does not operate on disks which do not use the HFS." I asked a friend what the problem could be, and he said that the PowerBook G3 uses HFS+. Why would a Power Macintosh G3 and a PowerBook G3, both using OS 8.1, have different Hierarchical File Systems? Can you please explain the difference between HFS and HFS+?

AHFS (Hierarchical File System) is the Macintosh's traditional file system. However, Apple introduced a more efficient file system with Mac OS 8.1. This improved file system, known as HFS+, can actually reclaim a significant part of your hard drive space. It is optional, however, so it is possible to install OS 8.1 without HFS+. The hard drives of many new Macs, such as the PowerBook G3s, come preformatted with HFS+. Older desktop systems such as yours shipped with the basic HFS.

HFS subdivides each disk into small, equal-sized "blocks" in which data is stored. This block size varies according to the size of the hard disk. On a 500MB disk, the size of a single block is about 8K, while on a 2GB disk, it is 32K.

This system is highly inefficient, however, as the amount of space a single file requires is a multiple of the block size. Consider that the block size for most 4GB drives is 64K. Any file less than 64K in size, even if it is only 1K, will always claim 64K of space. Because your Macintosh likely stores hundreds of files smaller than 64K on its hard drive, that's an awful lot of wasted space.

Mac OS 8.1's HFS+, on the other hand, frees this wasted space, making sure that a 1K file claims only 1K of hard drive space. When we reformatted a nearly full 3.2GB hard drive with HFS+, we reclaimed more than 500MB of hard drive space.

Scrub, Scrub, Scrub

QI may purchase a Power Macintosh G3 and give my 6100/60 to my son. I want to scrub down the 6100/60 completely to nothing more than System 7.5.5 and then only reload Microsoft Word. What is the easiest way to do this?

AThe best way to scrub the Mac clean is to reinitialize the hard drive and reinstall the system software. Boot your 6100/60 with either the System 7.5.5 CD or the Disk Tools floppy it came with. Once the system is booted, launch Drive Setup and initialize the hard drive. You'll get several messages warning that you're about to erase all your data, so make sure you've backed up your important information! After the disk has been initialized, simply install System 7.5.5. Once the

computer reboots with its newly installed system software, you can install Microsoft Word and hand the computer over to your son.

Sleep For Me

QI have a PowerMac 6500/250. I recently purchased a Sony VCR. Whenever my computer is in the "sleep" mode and I use the VCR remote or the VCR Plus activates, my computer wakes up. Is there anything I can do to prevent my computer from "waking up" when I use the remote?

AYour 6500 is equipped with a Sony-compatible infrared receiver. All 5x00 and 6x00 Macintoshes are designed to accommodate the Apple TV/FM System, which uses a television remote. When you use your Sony remote, the computer detects a familiar signal. It immediately wakes up and tries to comprehend the infrared command. When it realizes it hasn't a clue what the signal means, it fires off an angry alert sound.

On the front of your computer, you'll see a small, clear, black plastic circle that houses the receiver. To prevent your computer from waking when you use your remote, cover the infrared port with something opaque.

The Price of Ink These Days

QWhy are inkjet replacement ink cartridges so much more expensive than dot matrix ribbon cartridges? A friend of mine can print 3,000 to 4,000 pages

from a single laser toner cartridge that cost \$70 — yet my \$35 inkjet cartridge prints only 500 pages! What's the deal?

A Inkjet cartridges are more expensive than ribbon cartridges for one simple reason: Inkjet cartridges contain the printer's print head, while ribbon cartridges do not. The print head is the mechanism that does the actual printing, placing the ink on the paper. When you pop a new ribbon cartridge into a dot-matrix printer, you replace the source of ink. The exposed ribbon is slipped between a set of plastic guides, right in front of the print head. Conversely, when you pop a new inkjet cartridge in place, you replace the entire print head along with the source of ink. The electronic components in every inkjet cartridge raises the cost.

Laser toner cartridges also contain part of the print mechanism. The key difference between a toner cartridge and an inkjet cartridge is capacity. Because the toner cartridge is larger — it spans the entire page width — it can hold much more toner. This increased capacity means that the toner cartridge is changed less often.

Crash and Burned

Q After a recent crash of my new G3, I had to have the hard drive replaced.

After loading the system software and all of my applications back onto the computer, I now get the following dialog box every time I start the computer: "The installed substitution fonts are designed for use with standard QuickDraw. Please remove them and install the QuickDraw GX versions." Any ideas as to what this means?

A It appears that when you reinstalled your system software, you may have installed QuickDraw GX by mistake.

QuickDraw GX is an advanced page description/typography technology developed by Apple. Unfortunately, the technology was never adopted by the masses, and it will do you little good.

The simple solution to your problem is to trash QuickDraw GX. Pop

your system software CD into your Macintosh and look on it for the QuickDraw GX Installer. (If you're having trouble locating it, press Command-F in the Finder and search for "QuickDraw GX.") Launch the installer and click "Continue." At the top of the Installer window you'll see a pop-up menu showing the item "Easy Install." Select "Custom Remove" from that menu, check off all items listed below it, and click "Remove" to get rid of QuickDraw GX.

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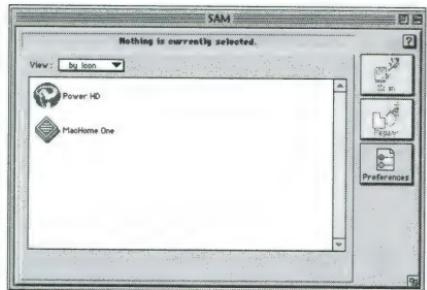
Get the Most out of Your Macintosh

Protecting Your Mac Against Viruses

We've all heard of computer viruses and the havoc they can wreak if your Mac falls prey to one. But fortunately, much of the hype surrounding viruses simply doesn't apply to the Macintosh platform. Of the thousands of computer viruses floating around cyberspace, most are the exclusive property (or problem) of the PC platform.

The Digital Disease

That said, there are viruses indigenous to the Mac. Some cause serious problems, but most are benign little irritants that go after your attention more than they go after your data or hardware. Many Mac



viruses simply throw silly sayings on your screen, prompt your Mac to make a sound, or other whatnot.

But how does your Mac contract a virus and, more importantly, how can you get rid of one once your Mac falls victim? We'll answer those questions, but first a little insight.

What Are Viruses?

Computer viruses are parasitic programs that attach themselves to other programs,

or to a particular program, installed on your hard drive. Viruses can't attach themselves to documents or files you create, only to applications such as your word processor and image editor. Your Mac's operating system is an application, which means it's vulnerable to viruses as well. Viruses are harmless until you either start your computer or launch an infected program.

Once in place, a virus can do a number of unsavory things: It can replicate and attach itself to other programs, intentionally damage files stored on your hard drive, delete the contents of your hard drive or, as is more often the case with the Mac, toss annoying messages onto your screen.

Viruses hold another potential for problems. The actual programming that makes up a virus can be flawed to the point that it causes your Mac to behave erratically, randomly crashing and freezing for no apparent reason.

How Does Your Mac Catch a Virus?

How does your Mac contract a computer virus? The only way is by communicating with another computer that harbors the virus, either when you download files from the Internet or a bulletin board service with your modem, or when you use an infected storage medium, such as a floppy or removable storage cartridge that you've gotten from a friend, the office, or some other source. Your Mac can also get viruses from e-mail attachments.

Keep in mind, however, that it's almost impossible to download a virus from one of the online services such as America

Online. These services meticulously screen each file before making them available for downloading.

Computerized Antibodies

Now that you know what viruses are and what they do, as well as how they're introduced to your Mac, you may be wondering how to protect against them. The answer is, with an antivirus application. These programs continuously monitor your hard drive, as well as such media as floppy disks and removable cartridges, for viruses. If the antivirus program detects a virus, it interrupts whatever you're doing and notifies you of the virus's presence. Then it isolates and destroys the virus before the invader can carry out its evil plot.

The two best antivirus utilities for the Mac are Symantec Antivirus for Macintosh (SAM) from Symantec and Virex from DataWatch. However, to keep them working the way they should, you must regularly update their definition files. The definition file contains information the antivirus program uses so it knows how to kill a virus should it encounter one. The developers of antivirus software make definition files available for free every month; you just need to download them from the company's bulletin board or Website.

If you're looking for a free alternative to the commercial antivirus programs, check out Disinfectant. This superb program

works in much the same way as its commercial counterparts, but it doesn't use separate definition files. Instead, whenever a new virus for the Mac appears, Disinfectant's author, John Norstad, updates the program and posts the new version of the entire program on the World Wide Web and online services for download. Unfortunately, Disinfectant doesn't detect the new Microsoft Word macro viruses, so to be best protected, use one of the commercial programs.

What's Your Address?

Who hasn't heard of the World Wide Web and seen the new catchphrase, "Visit us at www.whatever.com." Cruising around the Web is easy enough, and now that you have your new Macintosh, you'll want to communicate with other computers and computer users all around the world.

But have you ever wondered what the www.whatever.com means? What are these collections of letters, words and names, and how do they get you to a Website, perhaps on the other side of the globe?

Referred to as a URL, or uniform resource locator, the address tells your Mac what it needs to know to find a specific computer on the Internet and then to locate a particular file. Let's look at a typical URL and break down its components:

1. This part denotes the protocol, in this case *http*, or hypertext transfer protocol. The protocol tells your Mac how to

<http://www.machome.com/subscribe/macuserconvert.html>

communicate with a particular computer on the Internet. There are other protocols, such as *ftp* (file transfer protocol).

2. The *www* identifies the computer with which you'll be communicating. The *www* stands for World Wide Web.

3. The third part of the URL is the domain name. It points to the actual location of a computer on the World Wide Web. No two Websites can have the same domain name. To get a domain name, you must register the name you want.

The *.com*, referred to as a tag, means a Website is from a commercial institution. Other tags include *.edu* (educational institution), *.org* (noncommercial organization), and *.gov* (government agency). Sometimes the tag identifies a computer server located in a foreign country, such as *.ca* (Canada) or *.it* (Italy).

4. This part of the URL represents a specific directory, or folder, on the host computer's hard drive.

5. The fifth part identifies a file inside a directory or folder. The *.html* stands for hypertext markup language and specifies the type of file.

So, when you type the above URL into your Web browser, your Mac knows it'll communicate with another computer on the World Wide Web and that the computer's location is at *machome.com*. Once there, your Mac knows to look in a folder named "subscribe" for a document named "*macuserconvert.html*".

Actually, the process is much more complicated, but fortunately your Mac and the computers with which it commu-

nicates on the Internet handle the really hard stuff behind the scenes.

Always a Right Way

It's time to take a look at how to install new hardware products properly. As with software, you'll want to install hardware in the way that gets you up and running in the shortest time possible.

The first thing you should remember is to turn off your Mac's power. No matter what the new peripheral is, whether a monitor, hard drive, modem, printer, or scanner, it's always best to hook it to your Mac with the power off (though USB peripherals can be "hot-plugged"). Doing so ensures that you won't damage either your Mac or the new peripheral.

Before installing your new equipment, always check to make sure you have all the necessary parts (cables, ink cartridges, or anything else required for installation). Nothing makes hooking up new equipment to your Mac more miserable than getting halfway through the job, only to find you don't have everything you need to finish it.

Next, install the equipment according to the manufacturer's installation instructions. Make sure to read the installation instructions carefully before you begin. While it's easy to install any new piece of equipment to your Mac, different peripherals often have different hookup procedures. Reading the instructions first prepares you for exactly what you'll be doing.

Once you hook the new component to your Mac, it's time to install any software it requires (not all hardware components

require special software, but many do). Start by turning on your Mac and the new piece of equipment. Software installation for many devices requires that the device be on, because the installer talks to the device to gather information it needs. But as with all software installations, first make sure to turn off all unnecessary extensions and control panels by using Extensions Manager or another extension-management utility.

After you've completed the software installation, turn on your normal set of extensions and control panels and then restart your Mac. Voilà! You've successfully installed your new piece of equipment and can enjoy its many benefits immediately.

Make sure you put installation disks or CDs in a place you'll remember. Believe me, it's a real pain when you can't find the software you desperately need to make a piece of hardware work.

Trouble-Free Web Surfing

With the Web becoming an integral part of the computing experience, many first-time Web surfers have questions about how to get the most from their Web excursions. With the tips below, you can become a Web expert.

1. Get the fastest modem available. Today that means a 56K modem based on either K56flex or x2 technology. You can get a high-quality 56K modem for an affordable price, with many costing less

than \$150.

2. Subscribe to an ISP that provides the fastest 56K connection speeds and the most stable connections for your area. The quality of services provided by both local and national ISPs varies greatly. While many provide exceptional service, others will leave you pulling out your hair.



3. Install the latest browser version. In the past, browsers were unstable, frequently crashing or causing irritating system freezes. Today's browsers are far more stable, and faster, too. As of this writing, the latest versions of the two most popular browsers are Netscape Navigator 4.51 and Microsoft Internet Explorer 4.5.

4. Increase the RAM allocated to your browser. First, single-click on your browser's icon and select Get Info from the File menu. Next, go to the Preferred Size box and enter a value that's at least 20% greater than the specified value. Do the same for the Minimum Size box. But make sure not to enter a value that exceeds the amount of RAM installed in your Macintosh. Increasing the amount of RAM allocated to your browser gives it the memory to deal with complex Web pages.

5. Keep your browser plug-in usage to a minimum. Browser plug-ins, like the operating system's control panels and extensions, expand the abilities of your browser. They let you play sound and view video, for instance, and they provide myriad

other features. Many plug-ins, however, can cause system crashes. For this reason, use as few of them as possible.

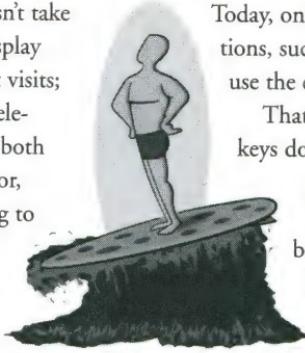
6. Set the size of your browser's cache to at least 5MB and preferably 10MB. Your browser's cache saves elements of the Web pages you visit to special files on your hard drive. That means it doesn't take as long for your browser to display those pages during subsequent visits; it simply retrieves the needed elements from the cache files. In both Internet Explorer and Navigator, increase the cache size by going to Preferences in the Edit menu and clicking on Cache under the Advanced option. Now, just enter the cache size in the Cache Size block.

7. While in your browser's Cache window, select the Once Per Session option to designate when your browser updates the Web pages you visit. By selecting Once Per Session, your browser gathers a Web page's information only once during your online session and then uses the page's cached information for subsequent visits, so pages load more quickly.

What's that Key Do?

Today, most Macs from Apple come with Apple's 105-key AppleDesign keyboard. Of those 105 keys, however, only 63 actually type a character on your screen. What are the remaining 42 keys for? Well, that's a good question, but first a bit of history.

Back in Apple's heyday, computers that ran the Microsoft DOS operating system



and required extended keyboards dominated the business world. Apple had to release an extended keyboard in order to compete. However, the vast majority of the extra keys on Apple's extended keyboard served no purpose. The Mac didn't need all the specialized keys — and it still doesn't.

Today, only a handful of Mac applications, such as those from Microsoft, use the extra keys.

That said, here's what the extra keys do in the programs that support them:

Help: The Help key brings up the application's built-in online help menu. Of course, the program has to have online help for this key to work.

Home: This key positions the cursor at the beginning of your open document.

Page Up: The Page Up key moves the cursor up through the document.

Del: This key deletes the character to the immediate right of the cursor.

End: The End key positions the cursor at the very bottom of the document.

Page Down: The Page Down key moves the cursor down through the document.

Esc: Many applications, including the Mac OS, let you press the Escape key instead of clicking on a dialog box's onscreen Cancel button with your mouse.

⌘ : The Command key rests on either side of the space bar; you use it in combination with other keys to execute keyboard shortcuts, such as ⌘-C to copy an element to the clipboard, ⌘-V to paste an element

from the clipboard into a document, **⌘-.** to abort a task your Mac is in the middle of executing, and so on.

Option: This key acts as a modifier key. In other words, when pressed in conjunction with another key, it modifies what that key does. For example, press Option-G to get ©, Option-8 to get •, or Option-R to get ®. You can use the Key Caps utility (accessible from the Apple Menu in the upper-left corner of your screen) to discover many other hidden characters accessible by pressing the Option key in conjunction with other keys.

F1 to F15: In most applications, the F-keys do nothing. But if you get a macro program, such as QuicKeys from CE Software or Speed Doubler 8 from Connectix, you can assign functions to the F-keys, or to any other key for that matter, such as automatically typing blocks of text or even launching applications. A macro program makes your keyboard more powerful.

The Meaning of Endings

As you become more familiar with your Macintosh, you'll begin browsing the Internet. Sooner or later, you'll start downloading software and discover a variety of files on your hard drive with strange suffixes, such as .sit, .mov, and .jpg.

File suffixes are a holdover from the PC world that help you determine what kind of file you have. Although you can usually tell what kind of file you're working with

on the Mac by its icon, you're more likely to see the file name listed on a Website than the file icon. Knowing what the suffixes mean can help you determine what application will open the file.

Compression and Encoding Suffixes

Most files on the Internet have been compressed so that they will take less time to download. Appropriately, several file suffixes reveal the way a file has been compressed. Files ending in .sit are StuffIt archives, and you decompress them with the freeware StuffIt Expander or StuffIt Lite. Files that end with .sea are StuffIt self-extracting archives; you decompress them simply by double-clicking the file. Files ending with .zip use a PC compression standard and are easily opened with the shareware utility ZipIt.

Some files you download from the Internet are specially encoded to ensure that your Macintosh receives the file correctly. BinHex-coded files are denoted by the .hqx suffix, whereas MacBinary-coded files end with .bin. Both file types are easily decoded with StuffIt Expander.

Document Suffixes

Of course, there's more to the Internet than compressed files. Every page on the World Wide Web is created with a language known as HTML (hypertext markup language). The file suffix for these documents is .html or .htm, and if you



find such a file on your hard drive, you can open it with Netscape Navigator or Microsoft Internet Explorer.

Documents with the suffix .jpg are graphic files that use the JPEG compression standard, while documents ending with .gif are graphic files using the graphic interchange format.

You can open JPEG and GIF files with many different applications, including Adobe Photoshop or PhotoDeluxe, and the shareware utilities JPEGView and GraphicConverter.

Documents ending with .mov are QuickTime movie files, while documents ending with .mpg are MPEG movie files. You can open both types with MoviePlayer, so long as your Mac has QuickTime 2.5 or later installed.

Making It Easy

Though the strange file suffixes can be intimidating, you'll soon become familiar with them. So get online and have fun!

Finding Help

Do You Know Where to Turn for Assistance?

While it's true the Macintosh is the easiest computer to work with, even its users need a helping hand every now and then in the form of technical support. But as a new Mac user, do you know where to find help? What's more, are you sure that the



tech-support source you select provides the best results?

You'll be happy to know you have several options, but the quality of support varies greatly from one source to the next. Let's take a look at a few tech-support options.

- Apple tech support: Of course, Apple provides tech support if you buy an Apple computer, but it's no longer as easy as picking up the phone, asking your question, and receiving an answer. Now Apple charges for tech support.

When you buy a new Apple Macintosh, you receive 90 days of free support from Apple. After the 90-day period has ended, you have to pay for each call. Apple offers several support plans, but basically the prices range from \$35 per call to \$340 for fifteen calls.

Of course, before making any tech-support call to Apple, you should first read the user manual that came with your Macintosh. It contains answers to many common questions. Beyond that, Apple offers other always-free support options, including its fax-on-demand service (800-SOS-APPL) and its Website at www.apple.com/support.

As for the quality of Apple's paid tech support, it varies from one customer to the next. Some people report speaking to absolutely worthless technicians who are incapable of helping with even the simplest of problems. Others give Apple tech support rave reviews, stating that the technicians take extra measures to ensure problems are resolved in a professional and

courteous manner.

You can get more information about Apple tech-support options on the Web at support.info.apple.com/support/supportoptions/suptline/aplsupline.html.

- Internet-based tech support: With the World Wide Web becoming such a commonplace computing resource, it makes sense that some entrepreneurial soul would set up a tech-support Website. Someone has: No Wonder at www.nowonder.com offers unlimited, free tech support.

No Wonder provides a marvelous service, and it's remarkable that it's free. Best of all, it supports a wide range of computing platforms, including Macintosh, Windows 95, and Windows NT.

What's more, through a partnership with No Wonder, visitors to the MacHome Website at www.machome.com can take advantage of free tech support by clicking on the tech-support link on our home page.

The technicians go out of their way to ensure each customer receives expeditious, high-quality tech support, and they'll even work with you on complicated problems that aren't easily resolved with a single question and answer. No Wonder tackles both hardware and software problems, and although it promises a response to your question within twenty-four hours, most customers receive a response in three to four hours.

- Retail store support: Many of us buy our Macs from places such as Fry's, ComputerWare, or other retail stores. As part of their customer service, these stores provide some degree of tech support. More often than not, however, they confine their support to the hardware purchased, and then only if you purchased it from that store.

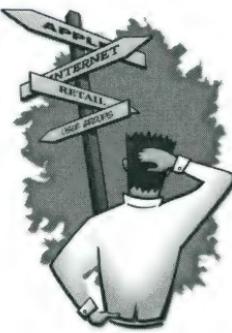
What's more, the quality of support you receive depends on the staff's knowledge of your particular computer, and, quite frankly, most retail stores don't have much experience with the Mac. The support they offer is a hit-or-miss proposition at best.

National reseller CompUSA has partnered with Apple to provide an Apple store-within-a-store at each CompUSA nationwide. As part of this partnership,

CompUSA will have employees trained on the benefits of the Mac, and they should be able to answer routine tech-support questions about the hardware and Macintosh operating system.

- Macintosh Users Groups: Many cities have Users Groups. These users' groups are collections of Mac enthusiasts who gather every so often to discuss and teach each other about all things Macintosh.

Mac Users Groups are a great place to look for tech assistance. Most of the groups have at least a handful of highly proficient Mac users who can help a new Mac user with almost every question. If



you have a Mac Users Group in your area, I highly recommend you join.

Out of Sight, Out of Mind

From time to time, you may use your Macintosh to prepare sensitive documents — a will, your income tax return, or a confidential letter. And when you do, you will want to keep those documents from prying eyes.

Basic Security Smarts

If you share your Macintosh, it's possible that coworkers, friends, or family members will accidentally stumble across sensitive documents. An "out of sight, out of mind" strategy may be the best course of action. Follow these suggestions to ensure your documents aren't easily reached:

- The Recent Documents feature in the Apple menu stores an alias of each document you open. Simply by visiting the Apple menu, anyone has access to sensitive documents you have opened recently. You can turn off Recent Documents by opening the Apple Menu Options control panel and setting the number of remembered documents to 0.

- Applications such as Microsoft Word and Freehand 8 list recent documents in the File menu for quick retrieval. A friend who uses your Microsoft Excel application to create a spreadsheet, for instance, may have access to your financial history. In the Preferences option of many such pro-

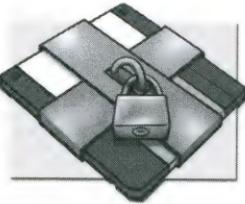
grams, you'll find an option to set remembered documents to 0. Or, open several nonsensitive documents to bump sensitive documents from the file list.

- Modern e-mail applications store both mail you've received and mail you've sent. If you've prepared or received any sensitive e-mail documents, be sure to delete them.

- Store your files in a folder and then use a program such as FileBuddy to make that folder invisible. Just drag the folder onto FileBuddy and check Invisible under

File and Folder Flag. This is one of the best ways to keep your sensitive files out of sight. Even if intruders use Apple's Find File to find a document, they won't be able to open it. But beware: Any person experienced with either FileBuddy or Apple's

ResEdit resource editor can make the folder reappear.



Advanced Security Options

A high-traffic office increases the opportunity for a coworker to snoop around your hard drive, perhaps with malicious intent. Hiding your files may not be enough protection. If you have serious fears about file theft, you need to purchase a Macintosh security program:

- Apple's At Ease for Workgroups (\$229) offers systemwide security for Macs routinely used by several people. You can assign each user a password, and thus tightly control access to the hard disk. No files can be opened, copied, deleted, or

renamed without permission. And you can prevent access to control panels and other applications that change system settings.

- Norton DiskLock (\$89) offers three levels of security: password protection, selective file locking, and encryption. DiskLock is your best choice if you want to limit access to your machine. Since the protection software loads before the system software, no one can start up your Mac without a password, even by trying to boot from a floppy or an external hard drive.

- Kent Marsh's FolderBolt Pro (\$99) locks folders up tight. Drag your sensitive documents into a folder and set a password. It's a simple and elegant way to keep your data safely out of reach.

Trust No One?

It may be unlikely that anyone will peek at your documents or steal your data. Still, certain things are best kept under lock and key — literally. Saving private documents to a floppy and storing it in a safe place is the most discreet way to protect your files from prying eyes.

You've Got Spam!

The greatest utility of modern computing is undoubtedly e-mail. In the blink of an eye, a message can be beamed around town, across the country, or around the world. In all likelihood, e-mail was a big reason you bought a Macintosh.

Like so many things gold, however, the glitter of e-mail has been tarnished by those who abuse the technology. The bane of e-mailers everywhere is unwanted e-

mail, otherwise known as "spam."

Caveat Lector

Spam comes in many varieties.

And as the saying goes, if it's too good to be true, it probably is. Consider the titles of the junk mail messages I received today: "Super Fat Burner: The Herbal Energizer," "Don't Pay, Get It Free," and "Good News! Get out of Debt Fast." Most people don't believe such claims, but spam succeeds by preying on the naive and unsuspecting.

Avoiding Spam Traps

Realizing that such mail is junk is the first step in your battle against spam. The second step is knowing how to keep your e-mail address off spam mail lists.

As a rule, avoid posting to Internet newsgroups, or use a secondary e-mail address. Spammers regularly harvest e-mail addresses from newsgroup postings.

When you fill out online forms to buy merchandise, download product demos, or enter contests, be sure to select any option that keeps you off mail lists. Forms might say, "Click here if you do not want to receive the XYZ newsletter" or, "Occasionally we make our mailing list available to selected companies."

Never, ever respond to unwanted e-mail. Replying lets the spammer know that you are using the e-mail address. To the spammer, it's all the more reason to keep you on the list.

**Spammers regularly
harvest e-mail
addresses from
newsgroup postings.**

Living With Spam

Despite your best efforts, you may not be able to avoid spam entirely. If you receive fewer than 10 spam messages a day, and many of them originate from the same place, you can configure many e-mail applications to delete the messages automatically. The return addresses don't have to be perfect matches; so long as the latter half of the address is always the same (such as "annoying.com"), your mail filter should be able to pick out and trash those items.

America Online provides extra mail controls for its members. Options include blocking e-mail from problematic addresses or receiving e-mail only from addresses you specify. AOL members who want to block unsolicited e-mail should press Command-K while online and enter the keyword "Mail Controls."

If you're overrun by spam, you may have only one option — to change your e-mail address. This may be either a simple switch or a logistical nightmare; if you've handed out hundreds of business cards listing your old address, use this option only as a last resort.

Taking a Bite out of Spam

The U.S. Senate recently passed legislation requiring bulk e-mailers to identify themselves correctly, noting their physical addresses and telephone numbers. The legislation also requires bulk e-mailers to remove addresses from mailing lists immediately upon request. Violators can be fined



up to \$15,000.

But the law may be difficult to enforce, and some people think it doesn't go far enough. The Coalition Against Unsolicited Commercial Email (CAUCE) is pushing for hard-line federal legislation that prohibits all forms of junk e-mail. Time will surely tell how long spam remains the scourge of electronic mail.

Upgrading your RAM

Room to Breathe with Additional Memory

After you become familiar with your Macintosh, you'll soon discover one truism of computing: It doesn't matter how much RAM you have; it's never enough.

Most Macs now ship with 32MB of RAM. While this used to be a whopping number, it's now barely enough to run the Mac OS, Microsoft Word, and Netscape Navigator at the same time.

If you're going to use your machine for either games or advanced graphics work, you should upgrade to 64MB, or even 96MB. Here are a few things you need to know about RAM.

RAM Upgrade Tips

- As a rule, you should always buy more RAM than you need. The RAM requirements for modern applications and games expand continually. If you buy only the RAM you need at present, you might find yourself running back to the computer store within three months.

- Plan for the future. The Power

Macintosh G3, for example, has only three RAM slots — one of which is filled with a 32MB module in most shipping configurations. If you want to upgrade the system to 96MB of RAM, add just one 64MB module instead of two 32MB modules. This leaves one slot open for future RAM upgrades.

32 Flavors and Then Some

There are several types of memory modules sold today. Refer to your manual to determine what type of RAM your Macintosh requires before you shop.

SIMMs, or "single inline memory modules" are an older memory standard employed by the first generation of Power Macintoshes. SIMMs have 72 "pins," or contact points, with the logic board. Models such as the 6100, 7100, and 8100 use SIMMs and require them to be installed in pairs.

DIMMs, or "dual inline memory modules," are a more robust memory module that have 168 pins. DIMMs come in several flavors, too, with newer DIMM standards offering increased efficiency and speed. Almost all second-generation Power Macs — the 5400, 5500, 6400, 6500, 7200, 7300, 7500, 7600, 8500, 8600, 9500, and 9600 — use 5-volt FPM (fast page mode) DIMMs. The Power Macintosh 4400 is the only Macintosh of that generation to specifically require 3.3-volt EDO (extended data out) DIMMs.

Power Macintosh G3s use newer, 3.3-volt SDRAM (synchronous dynamic RAM) DIMMs, while the iMac uses a more compact memory module known as

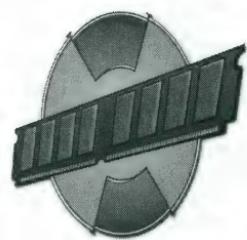
an SO (small outline) SDRAM DIMM.

Another factor you need to be aware of is the speed of the RAM modules. The first generations of Power Macintoshes require RAM modules that are 80 nanoseconds (ns) or faster; the second generation requires ones that are 70 ns or faster, and the third generation requires modules that are 60 ns or faster. Almost all RAM sold today is 60 ns or faster. You can place faster RAM in a slower machine without worry, although the machine won't be able to take advantage of the faster speed. If you're thinking about getting a G3 processor upgrade card for an older Power Macintosh, you should be sure that your memory is 70 ns or faster. Slower RAM can wreak havoc on accelerated systems.

Most second-generation Power Macs have the ability to "interleave" memory. Interleaving allows two DIMMs in paired slots to be addressed simultaneously, resulting in a 10- to 30% speed boost in RAM access.

DIMMentia?

If you're not sure about your RAM options or system requirements, consult Newer Technology's freeware GURU application. GURU (Guide to RAM Upgrades) lists all possible RAM configurations for every Mac ever produced and notes the specific type of RAM required by each system. GURU can be found at www.newertech.com.



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The Way It Works

The Inner Workings of Your Mac

Video Graphics: From CPU to Screen

After reading about new computer monitors, you may be ready to see the big picture. Before you shop, however, you need to know that a monitor is only one half of the display team. The Mac itself contributes the other half, and it helps determine the quality of the screen image.

Seeing It Clearly

You know that jack on the back of your Mac where you plug the monitor in? That's the tail end of the video graphics system. This collection of electronic components takes the data churned out by your Mac's processor and turns it into data your monitor can use.

The Mac's processor, along with your software, creates a series of ones and zeros — digital data — that represents an image of your work.

This image is stored in the graphic system's video memory. Like the Mac's own processor, the video graphics system uses RAM to hold information it's working with. Here it's a special, faster kind of memory called VRAM, or video RAM.

The amount of VRAM limits the image size with which the whole graphics system can work, and therefore determines the resolution and color quality you see on your monitor.

What's size got to do with it? Computer color is set by how many bits (the smallest unit of data) are used to describe each



pixel (the smallest measurement of a computer display). Black and white uses just 1 bit per pixel, while high-end displays use 24 bits per pixel for a palette of 16.7 million colors. Because a wider range of color requires more data to describe it, more VRAM is needed to hold the description.

Color depth isn't the only aspect of image size. There's also resolution, or how many pixels make up an image. An image 640 pixels high by 480 wide, for example, consists of more than 300,000 pixels. A higher resolution means more pixels and therefore requires more VRAM.

You can see the relationship this way: The number of bits per pixel multiplied by the number of pixels in the image tells you how much VRAM the image needs.

You can vary the resolution and color depth to make the most out of your installed VRAM: If you use a lower resolution, you have more memory left for color; conversely, using a reduced palette lets you work with a bigger image.

From Data to Signal

The VRAM holds each image as it's made by your Mac. Your Mac's video system then retrieves the image, and a component called a DAC converts the digital data to an analog signal. Your Mac then sends the analog signal to the monitor.

The frequency of the signal conversion matches the frequency of the the monitor's

display. The display must be refreshed sixty or more times every second so that the monitor's image doesn't flicker and keeps up with whatever you are doing.

The speed of the retrieval, conversion, and output process determines how quickly an image displays on your screen. For example, a slow system can take many seconds to draw a big Photoshop file on the monitor; a fast video card will complete the whole picture in a fraction of a second.

Multiple Choice

Most Macintoshes have a video graphics system built into the logic board. Others have this circuitry on a card that plugs into the logic board.

You can use built-in and plug-in systems simultaneously, driving two or more monitors that show one contiguous working area. Drag a document from one display to the other, or spread it across both.

Video graphics systems have developed tremendously, with specialized chips handling what used to require complicated boards. Like everything else about the Mac, video graphics continue to improve at a rapid pace.

A Look at the New G3 Processor

Apple's new Power Mac G3 systems are the fastest computers ever released to the consumer market. They outperform all previous Power Macs and even blow away the Pentium-based PCs. But what if you just bought a new Power Mac and don't want to buy another new system? Don't worry. You can toss a Newer Technology

MAXpowr PRO G3 processor card into your compatible Power Mac to produce one of these ultra-speed demons.



The PowerPC G3, a joint collaboration among Apple, Motorola, and IBM, represents an entirely new processor technology. But what sets it apart from previous processor technologies?

In the Old Days

The G3 uses a technology that dramatically increases its performance; a G3 rig running at 266MHz is about nine to ten times faster than a Power Mac 6100/66.

The technology that pushes the G3 to such remarkable speeds is known as backside cache. While the G3 itself is no slouch, it's the backside cache, mounted directly on the CPU board, that lets it operate at such incredible speeds.

In part, a processor works by relying on Level 2 cache memory to store frequently used data and instructions. Level 2 cache memory is much faster than standard RAM and therefore allows the processor to operate at a high speed.

The problem, however, has always been the physical separation between the Level 2 cache and the processor. To communicate with each other, the two had to rely on the system bus, an electronic roadway on the logic board over which the processor and all logic board components communicate.

The system bus has a maximum speed (known as bus speed) at which data can

flow across it. And it's the bus speed that's always been the slowest link in the chain, preventing the processor and Level 2 cache from communicating with each other at their fastest. Until the G3 processor with its backside cache came along, the Level 2 cache and processor had to deal with a system bus that operated at a numbingly slow 40MHz to 50MHz.

The New Kid on the Block

With the G3 processor, that all changes. The Level 2 cache now resides directly on the CPU board and not on the logic board (the CPU board plugs into a special slot on the logic board). Moreover, a special system-independent bus ties the cache and processor together directly. This special backside bus operates at a much higher speed, typically half the clock speed of the processor. That means both the processor and Level 2 cache communicate with each other at their maximum speeds, translating into greatly increased overall system performance.

Also, because the backside bus is independent of the system bus, the Level 2 cache and processor can communicate with each other over their separate bus at the same time that other components on the logic board communicate across the system bus. That means still more processor performance, because the processor and Level 2 cache never have to wait their turns to use the system bus.

With the G3's new backside cache tech-

nology, no longer is the robust and speedy PowerPC processor's performance restricted by system bus limitations. Now it breezes along faster than ever before, meaning you can work faster than ever before.

Technology marches forward — and now it's starting to do so at warp speed.

How Your Scanner Works

As recently as three years ago, scanners were too expensive for the majority of computer enthusiasts. Often costing well over \$2,000, scanners were the equipment of professionals only. But fortunately, those are bygone days. Now you can get a high-quality flatbed scanner, one that would have cost big bucks a few years ago, for well under \$500.

Scanner technology has come a long way. But did you ever stop to consider how scanners work? Considering the complicated task they perform, their low prices really are amazing.

Scanners come in two varieties: single-pass and triple-pass. A single-pass scanner gathers all the image information during one pass of light down the page, whereas a triple-pass scanner gathers red, green, and blue image information during three separate passes. Triple-pass scanners generally provide higher-quality scans.

To start the process with either kind of scanner, you click the Scan button from within your scanner-supporting application. Your Mac then instructs the flatbed scanner to turn on its scanning light or



lights, which are attached to the scanning mechanism. Triple-pass scanners have three lights; single-pass scanners have one.

After the light or lights go on, a motor moves the scanning mechanism down the page, which sits above the scanning mechanism on the scanning glass. As light illuminates the page, the page reflects the light; bright or pale colors and white reflect more light, and dark colors and black reflect less.

The reflected light falls onto a sensor array called a CCD, or Charge-Coupled Device. As the reflected light hits the CCD, the sensors convert it into voltages. The actual voltage levels correspond to the intensity of the reflected light needed to generate white, black, or specific colors.

The CCD passes the voltages to an analog chip for gamma correction. Gamma correction enhances dark tones and colors so the eye can more easily recognize the image once it's displayed on the screen. The driver software for most scanners lets the user adjust the amount of gamma correction applied to scanned images.

Next, the data composing the scanned image passes into an A-D, or analog-to-digital, converter. The A-D converter changes each line of the image from its analog format into a digital pixel format your Mac can understand. The scanner then sends the pixel information to your scanner's software, which does the final processing before displaying the image on the monitor screen.

Scanners are truly a wonder of modern-

day computing, and despite their complexity, they require no specialized knowledge to operate. Just place the image you want scanned and click the Scan button. That's all there is to it.

A Look Inside the Floppy Drive

With applications becoming larger and more complex, the days of installing software from floppy disks is nothing but a distant memory. Case in point: Microsoft Office. If you were to install Microsoft's popular suite from floppies, you'd have sixty-plus disks with which to contend.

Today almost all software comes on CD-ROM, and with the popularity of Iomega Zip and Jaz drives and other removable storage media at an all time high, the once-essential floppy drive has taken a back seat to these more modern technologies. That said, the floppy drive is still an important component of any Macintosh. It lets you store and transport files, and smaller applications and utilities still come on floppies. Here's a rundown of how your floppy drive works.

Please Insert Disk ...

When you insert a floppy into its drive, you set in motion a complicated process. First, as the floppy enters the drive, it activates a series of levers and gears. These devices position the floppy and open its metal shutter to reveal the disk inside the plastic shell.

The disk is a very thin piece of mylar coated on either side with magnetic material that holds data. Another set of gears and

levers position the two read/write heads so that they almost touch the surface of the mylar disk on both sides. The read/write heads are actually tiny electromagnets.

Saving Data

When you instruct your Mac to save data to a floppy disk, the CPU sends the data from RAM to the floppy drive's controller board, along with instructions for what the controller board should do with the data. The controller board processes the instructions and organizes the data, and passes everything along to the drive's circuit board.

The circuit board takes the instructions and converts them into signals. It then sends these signals to the circuitry that controls the movements of the read/write heads. The circuit board also checks the disk to make sure its write tab is in the proper position for writing data to the disk. If the tab is open (write-protected), a diode emits a beam of light that a separate photodiode detects. The light-detecting photodiode then signals the circuit board that the disk isn't ready to receive data. If, however, the tab is closed (write-ready), the light-detecting diode doesn't detect a light beam and signals the circuit board that the disk is ready to receive data.

At that point, a small motor beneath the disk raises a shaft that engages the spin hub on the bottom and center of the disk.

The shaft then spins the hub in the direction necessary to write data to the disk. The circuit board controls the movements of the shaft.

When the read/write heads are in their proper positions, the circuit board converts the data into electrical signals it sends to the heads. Electrical current creates magnetic fields in the heads that reorganize magnetic particles embedded in the electromagnetic material coating the disk. The heads organize these particles into a series of ones and zeros.

These ones and zeros represent the data you saved to the disk. When you retrieve

that data from the disk, the read/write heads work in just the opposite manner: Instead of changing the magnetic fields of the particles and organizing the particles on the disk surface, they react to the magnetic fields generated by the particles.

The heads then convert the magnetic fields into signals that travel through the circuit board and onto the CPU for storage in your Mac's RAM.

The Power of Voice

Those of you who have installed Apple's Speech Recognition software have no doubt marveled at your Mac's ability to respond to voice commands. That brief moment when science fiction meets reality can be truly humbling. Yet it's not magic — it's a pure application of science made possible by today's ever-increasing processor speeds.

The Nuances of Speech

When we speak, our vocal cords vibrate, causing the surrounding air molecules to compress and expand in time with the vibrations. This creates a sound wave that travels through the air. When the sound wave strikes a microphone, it causes the microphone's thin diaphragm to vibrate. The diaphragm vibrations in turn cause an attached metal coil to move within a magnetic field, which creates an electrical current pulsing in time with the original vibrations. This current travels to your Mac, which converts it to digital data.

The speech recognition engine then simplifies the digital data into a series of patterns, which are cross-referenced with a template of digitized "phonemes."

Phonemes are the smallest, most basic sounds of language, which include all vowel, consonant, and compound-letter pronunciations. (The word "book," for example, is composed of three phonemes: "b," "oo" and "k.") Each phoneme has a unique vibration pattern, and by extension, a unique digital pattern. If a part of the simplified digital data closely resembles the template pattern of the sound "b," for instance, a match will be declared. The speech recognition engine continues, deciphering additional phonemes as they stream in from the microphone.

To make sense of the sounds it deciphers, the Mac must cross-reference phonemic combinations with potential commands. In the case of Apple's Speech Recognition software, recognizable commands are stored in the Speakable Items folder. To add a new voice command, such

as "Launch Netscape," you make an alias of the Netscape Navigator file, rename the alias "Launch Netscape," and drag it into the Speakable Items folder. If you then say "Launch Netscape" to your Macintosh, the recognition engine will dissect the audio and recognize the individual phonemes that make up the words. To determine the meaning of the phonemes, it will compare them to the spelling of each item listed in the Speakable Items folder. Variations in speech and spelling make a perfect match unlikely; instead, the recognition engine will make the best guess among similar items. When it finds "Launch Netscape" to be the most likely match, it opens that alias and starts the program.

Dictation applications, such as Dragon System's PowerSecretary, work very similarly to Apple's Speech Recognition system but recognize 30,000 to 60,000 individual words. These applications, however, require verbal training to increase the accuracy of their recognition engines. To familiarize an application with your distinct voice, you read several standard paragraphs to the Mac and correct any speech-recognition errors.

Full Speech Ahead

Four years ago speech recognition was still a grand experiment, able to understand only a small library of verbal commands. Today programs can recognize a vocabulary of up to 60,000 words. Faster processors will allow more stringent recognition engines that will be able to understand a variety of dialects, and even entire lan-



guages. Combined with intelligent software, speech will soon become the interface of choice for your computer, your car, and your coffeemaker. "Tea, Earl Grey, hot," anyone?

Photography Without Film

The instantaneous nature of digital cameras has made them a hit. There's no waiting involved, no film to buy, no dark rooms, no chemicals. The technology behind the shutter is a fascinating application of science.

From Light to Byte

Digital cameras capture images with the help of a special semiconductor known as a charged-coupled device (CCD). In most digital cameras, the CCD consists of a tiny matrix containing thousands of photosensitive elements. Overlaying the matrix is a patterned filter that allows each element to see only one primary color — red, green, or blue.

Pressing the camera's action button swings open the camera shutter for a fraction of a second. While the shutter is open, rays of light reflected from objects in front of the camera strike the CCD. Each photosensitive element registers a specific intensity of light as an electrical charge. The electrical charges then pass to an analog-to-digital converter that transforms them into digital data.

To determine the actual color value of any one pixel, the camera's software makes a calculated guess based on the values registered by three adjacent photosensitive

elements. The true color value of a red-filtered pixel is thus determined by the value of its green and blue neighbors. This process significantly reduces the resolution of the image.

Consider this example: A tree far off in the distance has branches that should appear one pixel wide in a digital image. If you take the photo with a standard digital camera, the detail of these branches will be muted by the value of nearby pixels, which reflect the sky in the background. Instead of getting clearly defined branches, you'll see a blue-brown blur.

Once the color values of the image have been calculated, the image must be stored for later retrieval. A full-color image at 640 x 480 resolution is typically 900K. Conventional wisdom suggests you'd need 22MB of storage space to save twenty-four images. Most digital cameras ship with a scant 2MB of storage, however, employing the JPEG compression protocol to squeeze an image to one-tenth its original size. Using smaller storage cards and a compression scheme reduces the cost of digital camera, but this economy comes at another price: Compression often further reduces image quality.

To retrieve pictures, you connect the digital camera to the computer with a serial cable. Software on the computer then initiates the transfer of the images from the camera's storage card. Once the image is fully transferred, it is saved as a file, which you may print or edit, on the com-

puter's hard drive. You may then erase the camera's storage card to make room for a brand new series of pictures.

Digital cameras have much to overcome before they can replace traditional film completely. The technology remains far more expensive than 35mm cameras, despite the much lower picture quality of digitally captured images. For now, digital cameras provide an easy way to capture low-resolution images for digital publications and catalogs, marking a slow-but-sure step toward a paperless society.

A Million Points of Light inside a Liquid Crystal Display

Liquid crystal displays (LCDs) are no longer exclusively for laptops. As technology advances and prices fall, LCDs are appearing on desktops. Here's how these visual wonders work.

Crystal Blue Persuasion

A liquid crystal display consists of a thin layer of liquid crystalline material between two layers of glass. Unlike a traditional monitor, which creates points of light with an electron gun, LCDs filter and color pure white light. A fluorescent tube provides backlighting via an electroluminescent panel beneath the display.

Liquid crystal has characteristics of both liquids and solids. As with a liquid, its molecules flow freely, but as with a solid, they tend to face the same direction as all their neighbors. The molecular orientation of these molecules, controlled with the application of an electrical current, determines the transparency of the crystalline material.

An LCD screen is subdivided into thousands of "pixels" — tiny squares that combine to form the onscreen image. A matrix of transparent electrodes in the display controls the orientation of the liquid crystal molecules in each pixel, determining the intensity of light allowed through. At one extreme, the molecules allow light to pass directly through, creating a white pixel; at the other, the molecules stop all light from passing through, leaving a black pixel.

In a color LCD, each pixel you see is actually made up of three color-filtered subpixels — one red, one green, and one blue. The intensity of each subpixel determines the color of the overall pixel.

There is more than one type of LCD, however, and the differences between the types are significant, especially in terms of cost. Each kind is distinguished by the way it addresses the liquid crystal molecules that make up each pixel.

The simpler and less expensive form of LCD is the passive-matrix display (also known as STN, or "supertwist nematic"). Voltage is applied to both the row and column containing a pixel to effect a change; when the voltage overlaps, the liquid crystal will reorient. The downside of this kind of display is that only one pixel can be addressed at a time, and each pixel must be addressed successively, slowing the rate at which the screen can be drawn.

This limitation causes other problems, such as "ghosting." For example, when you move the mouse pointer, a ghostly trail will follow it due to the screen's inability to redraw quickly enough to keep up with

the quick movement of the pointer. Other passive-matrix weaknesses include a narrow viewing angle and poor contrast.

The more sophisticated type of LCD is the active-matrix display (also known as TFT, or "thin film transistor"). Each pixel is individually controlled by a single thin film transistor (an electric switch) that lies behind the layer of liquid crystal. There is no bleeding or ghosting because the screen redraws more quickly and voltage is applied only to an individual pixel, not its entire row or column. The resulting image is very sharp and can be viewed clearly from wide angles.

Trust Your Eyes

Put a passive-matrix LCD screen beside an active-matrix screen, and anyone can see the difference. Infrequent users who do mostly stagnant work (e.g., Web browsing and word processing) can probably cope with the lower quality of a passive-matrix display, but gamers, graphics artists, and high-endurance users will regret choosing anything but the active-matrix option.

Modern Telephony

The erstwhile purpose of the telephone system was to carry voice from one place to another. And yet now we use it daily to transmit news, letters, images, video, and applications to each other at ever-increasing speeds.

This transformation — the linking of



computers all over the world — was made possible by the modulator/demodulator, commonly referred to as the modem.

Bits to Waves

Sound is an analog signal — a wavelength that varies in both amplitude (height) and frequency (pitch). When we speak into a phone, the sound wave our voice emits

strikes the microphone and causes its thin diaphragm to vibrate. The vibrations move an attached metal coil within a magnetic field to create an electrical signal. The signal is then carried to a central switching station, where it is redirected. When it reaches the listener's phone, it makes the speaker vibrate in time with the pulse, creating a duplicate of the initial sound waves.

Conversely, a digital signal is a stream of voltage pulses and lulls that represent binary code (ones and zeros). But to be sent over telephone lines, digital information first must be transformed into an analog signal, which is where the modem comes in. A modem modulates the digital signal, creating an analog wavelength whose variations in amplitude and frequency represent the digital data. At the other end of the telephone line, another modem demodulates the incoming wavelength and sends the deciphered digital signal to the computer for processing.

A modem signal experiences several conversions en route to its destination. As it leaves your modem, it is an analog signal. Once it arrives at a central switching

station, it is converted to digital format and transferred along digital lines to a switching station near the receiver. As it leaves that station, it is converted to analog again. At the receiver's home, the signal makes a last conversion to digital.

Analog-to-digital conversion affects the accuracy of the data transmitted and limits the speed at which it can be transferred. Noise introduced by the telephone network's analog-to-digital converters can modify the signal. As a result, the signal demodulated by the destination modem may not match the original.

Error-control protocols address data garbling by requesting retransmission. But the faster you send the signal, the greater the likelihood of errors; pushing analog transfer rates beyond 35 Kbps (kilobits per second) is impossible because the signal-to-noise ratio becomes far too high.

The 56K Revolution

Today's telephone networks are becoming more digital; many Internet service providers (ISPs) now have direct digital connections to the telephone network. And 56 Kbps modems can receive downloading data as a digital signal. A stream of voltage pulses can thus be routed from your ISP to the telephone network and on to your home without any analog modulation, resulting in fewer errors.

There are limits to 56K technology, however. Modems can't send digital signals, so uploading data still requires digital-to-analog modulation. Download speed can't exceed 56 Kbps; telephone line noise

remains a limiting factor.

The emerging ADSL (Asymmetric Digital Subscriber Line) may soon displace the 56 Kbps modem. ADSL uses a specialized high-bandwidth transmitter to transform a standard phone line into a light-speed digital connection. Reflecting the fact that downloads outweigh uploads, ADSL connections receive data at speeds up to 6,100 Kbps but send it at 640 Kbps.

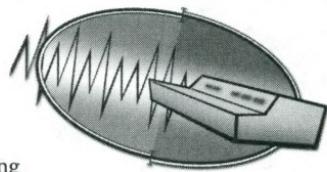
Faster download rates promise to make technologies such as videoconferencing an everyday reality. As a result, the world's telephone networks will take us places unimaginable a few years ago.

You're on Candid Computer

The era of ubiquitous digital video is upon us. However, converting standard video elements into a format your computer can understand is a complex process.

Light reflecting off the objects around us allows us to see them. The retina at the rear of our eyes registers the intensity and color of the light patterns and sends the information to our brains.

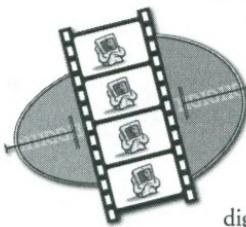
A video camera works in much the same way. Light enters the camera lens and breaks into the three primary colors: red, green, and blue. The lens focuses the individual colors on small panels coated with a light-sensitive and electrically conductive compound. The greater the intensity of the light, the greater the electrical current generated. The differences in the electrical cur-



rent across each panel are registered as analog wavelengths that vary in amplitude (height). These red, green, and blue signals are then combined at different frequencies to form an analog video signal.

The first step in creating digital video is converting the analog video signal into digital format. A Power Macintosh equipped with a video-digitizing card can accept several types of analog input: RCA jack, commonly used to connect a VCR or video

camera to a computer; S-video, an advanced standard that separates the red, green, and blue signals for better quality; and coaxial cable (if the digital video card has a



television tuner). The digital video card takes the analog video signal and splits it back into the three primary colors. To determine the color of a single pixel, the digital video card monitors each color signal for a fraction of a second. The individual intensities of the red, green, and blue signals are then combined to determine the pixel color that should be displayed. Exactly how long the signals for a single pixel are monitored depends on the specified picture resolution and frame rate. If you have chosen to record video at 320 x 240 pixels at 15 frames per second, the digital video card must determine the colors of 1,152,000 pixels within just one second.

Because the color value of each pixel recorded is 24 bits (or three bytes), the amount of space required for digital video

can add up very quickly. A single frame of video at 320 x 240 requires 225K of hard-drive space; at 15 frames per second, a single minute of video requires 200MB of hard-drive space.

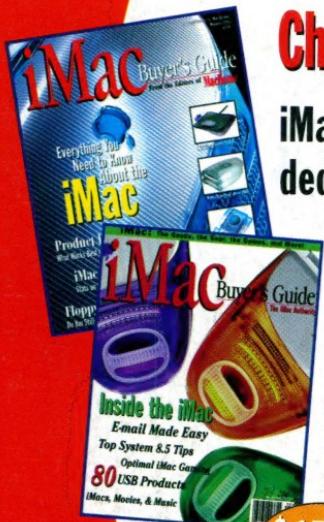
Digital video in this raw format is far too bulky for everyday use. To be truly useful, it must be compressed to a size that's manageable for editing and transmission. Digital video compression is handled by Apple's QuickTime extension, which contains a number of compressor/decompressors (codecs) suited for different uses.

The compressors work principally by noting similar elements in each successive frame of video. Consider a one-minute interview with Steve Jobs. The camera is stationary. Steve sits in a chair, his head, body, and arms moving as he speaks. However, much of the background remains the same through each successive frame. Instead of including the color value of every pixel representing the background in every frame, the compressor notes the pixels that stay the same, and for how long they stay the same. If a 120 x 60 background element stays the same throughout the interview, approximately 18MB can be shaved off the file. The compressor nips and tucks wherever it finds similarities to reduce file sizes as much as possible.

Compression schemes are becoming more efficient, disk drives are larger, and high-speed telephony is here. In the future, the digital video content you view on your Mac may be indistinguishable from TV — except that you can watch what you want, when you want.

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